

MAY 25 1927

AUTOMOTIVE INDUSTRIES

Volume 56
Number 20

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, MAY 21, 1927

35c a copy
\$3.00 a year

Appearance {
Appearance | Appearance
 | Engineering
 | Assembly

Wheels are the one important *mechanical* feature subject to option.

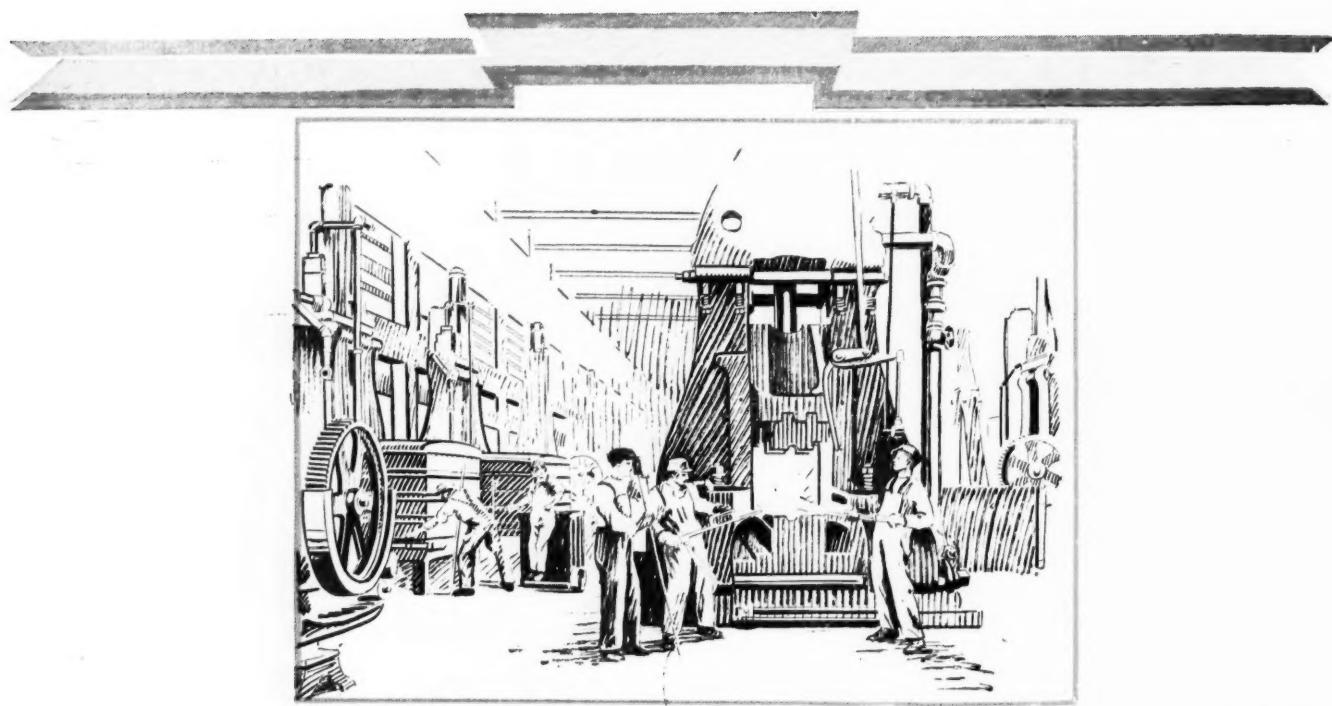
A matter decided in the salesroom largely upon the basis of appearance, concerns the factory from the standpoints of appearance *and* engineering *and* assembly.

This is one of the pressing problems which Motor Wheel has most completely and successfully solved for car manufacturers.

It is another example of the value of calling in Motor Wheel. . . . Great names are augmenting the list of cars equipped by Motor Wheel—by far the longest list in the wheel business.

MOTOR WHEEL CORPORATION, LANSING, MICHIGAN

Motor Wheel



An achievement in workmanship

Red Seal Continental Motors are an achievement in workmanship. No finer materials are known in the engineering world than are used by Continental. No closer precision limits are secured than those afforded by Continental facilities.

8100 skilled workmen and twenty six

years motor building experience are contributing factors in the recognized quality of dependability and superior performance of every Red Seal Continental Motor.

CONTINENTAL MOTORS CORPORATION
Offices: Detroit, Mich., U. S. A.
Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World



Continental Motors

AUTOMOTIVE INDUSTRIES

VOLUME 56

Philadelphia, Saturday, May 21, 1927

NUMBER 20

Industry's Advertising Budget Reaches Huge Total

Fifty leading companies in 1926 spent more than \$41,000,000 in newspapers and national magazines, or an average of about \$820,000 each. Other items swell cost.

By John Cleary

WHAT price advertising? That is a question which should concern automotive manufacturers today. It is prompted, in this instance, by a simple analysis of the recently published lists of the leading national advertisers during 1926.

Those lists indicate that of the 127 automotive manufacturers who spend in excess of \$10,000 annually, the 50 leaders expended more than \$41,000,000—or an average of more than \$820,000 each—for space in national magazines and daily newspapers alone, last year.

The figures are not padded. On the contrary, most companies are known to have spent more than the figures show.

The formidable grand total and the surprisingly high average of the expenditures are not created by inordinately heavy appropriations of a few advertisers. As a matter of statistics, the published records show that the total was divided as follows:

Three companies spent less than \$200,000.

Fifteen companies spent more than \$200,000 and less than \$300,000.

Ten companies spent more than \$300,000 and less than \$600,000.

Eight companies spent more than \$600,000 and less than \$900,000.

Eight companies spent more than \$1,000,000 and less than \$2,000,000.

Four companies spent more than \$2,000,000 and less than \$3,000,000. Only one company is listed as having expended a little more than \$3,000,000, and only one other company is reported to have spent slightly in excess of \$4,000,000.

Art and mechanical costs—always a substantial item, and now especially so, in view of the industry's present predilection for color pages—are not included. The figures given are for space alone.

The reports do not include the amounts spent in newspapers by local distributors and dealers, except in a few instances of cooperative newspaper

advertising with the factories. Nor do the figures embrace the sums invested in farm papers, business papers, direct mail, outdoor advertising, catalogs, booklets, folders and the the multitudinous services rendered by the factory advertising departments—all of which cost money.

Add all these costs to the \$41,000,000, and you will have an idea of the advertising outlay of 50 automotive manufacturers. Then add to this total the amount spent by 77 others, and you will know the grand total of the advertising expenditures of the 127 manufacturers in the automotive field who spend more than \$10,000 a year in general advertising.

We could make a guess at that grand total, but it would be only a guess and such a guess would not affect the purpose of this article.

That purpose—inspired by the report of the expenditures of the 50 leading automotive advertisers—is not to condemn these appropriations as profligate. Nor is there a disposition to criticize any persons or groups having to do with the disbursement of these advertising funds.

This is not an attack.

It is an inquiry—a calm, dispassionate inquiry, addressed to every automotive manufacturer in the industry.

Its purpose is one of helpfulness.

Briefly, the inquiry may be summarized in two questions:

1. Is it necessary for you to shovel money into advertising by the hundreds of thousands and the millions, in order to create reputation and produce sales? In other words, must the degree of success of your advertising be measured solely by the size of your appropriation? Can you become a "leading" advertiser only by "leading" in the amount of money spent?

2. Are you—as an automotive manufacturer—giving to the purchase of advertising anything like the meticulous attention you give to your company's



other purchases. Purchases of machinery, parts, accessories? Purchases of your manufacturing, engineering and selling talent? Purchases of labor and other service?

Let us look into the first question.

Time was—and not so long ago—when some of the most successful advertisers took pride in being able to lead their competitors in results, in business and in reputation, while falling considerably behind them in the size of their advertising appropriations. By expert skill and painstaking care in the preparation of distinctive copy and art, by unbiased judgment in the selection of media, and by scientific adroitness in the staggering of insertions, they were able to get disproportionately good results from their advertising—disproportionate, that is, when compared with the results of other advertisers spending considerably more money but lacking the same skill and knowledge and judgment.

Acknowledged Among Leaders

They were acknowledged among the country's leading advertisers, acknowledged by the industry, by the trade, by the public—yes, even by the advertising profession itself—and yet they were not included in the lists of the fifty leading advertisers who spent the most money.

Reputation and sales combined to form the yardstick of advertising success in those days.

Today there is a mad scramble for advertising leadership, and the yardstick seems to be the size of the appropriation.

Is that the way you want your advertising's effectiveness measured?

Do you believe that you can double the results of your advertising merely by doubling your appropriation?

True, the increasing keenness of competition and the ever-increasing advertising rates make it more difficult to do as good a job of advertising on the appropriations of a few years ago. But it is also true that the law of diminishing returns is operating just as effectively now as it was then.

Brains and care can still take the place of dollars in carrying on an efficient, resultful advertising program.

There are just so many people and just so many national magazines, for instance. You can profitably use so many magazines so many times to reach the people you want to reach. That will cost you so much money. How much it should cost is less than some automotive manufacturers are spending in national magazines today.

Careful Planning Required

Even if you are one of the big manufacturers, an appropriation of, say, \$1,000,000 is quite a respectable lump to spend and careful planning is required if it is to be spent profitably and advantageously. A number of manufacturers spend that much in the national magazines alone.

If you are one of the smaller manufacturers, the amount you can profitably spend in the national magazines is much less. The fewer your distribution points, the smaller your profitable appropriation for national magazines will be.

An editorial in *Automotive Industries* of November 11, 1926, suggested that there may be something wrong with the generally accepted belief that national distribution quite naturally follows national advertising. Based on the 1925 sales of 37 makes of cars, as compiled by a well known statistical agency, it was pointed out that only 19—or about half of them—sold more than five cars in every state in the country, the inference being that if only five cars or less can be sold in an entire state

during a period of 12 months, successful distribution over that particular territory can scarcely be claimed.

Data for 1926 sales are now available from the same source as those used for the previous analysis and they show almost the same picture as the 1925 record. Using the same 37 makes we find that again 19 succeeded in making more than five sales in every state during 1926.

But, as we continue with the analysis, we find that of the 18 cars which failed to gain complete national distribution, as we have defined it above, 11 failed in more states during 1926 than during 1925 while only five cars succeeded in making over five sales in more states last year than during the year before that.

The actual number of failures per car-state—that is, the summation of number of cars failing to make over five sales and the number of states in which this occurred—was greater in 1925 than in 1926. The total for 1925 was 182, or, in other words, the 18 cars made but five or less sales in an average of 10 states each. During the last year the total decreased to 163, giving an average of nine states in which each of the 18 cars failed to make over five sales.

This apparent improvement was caused entirely by the record of two cars which, during 1926, gained our present criterion of national distribution in an average of 15 States more than they had during 1925. Eliminating these two makes from the tabulation, the data show that national distribution during 1926 was even less successful than during 1925.

Explanation Hard to Find

We can offer no explanation of this condition. It obviously is not caused by high price of cars and low purchasing power of the residents of particular states since, as was explained in the editorial referred to, the cars which do not have good sales in all states are not necessarily those in high price classes and in every instance where certain cars have failed to register over five sales in a State other cars selling for considerably higher prices have obtained good sales volume.

The concluding paragraph of the editorial might be repeated, as it still appears applicable. "Whatever the reason, it seems evident that some manufacturers, at least, failed to cash in fully on the national advertising campaigns which they conducted. When nationally advertised cars fail to make more than five sales in from one to over 30 states (24 is the maximum for 1926) it may be time to give very careful consideration to the effectiveness of present merchandising policies."

The smaller manufacturer, with a limited number of distribution points, is paying a higher rate for his national advertising than the big fellow. Since the rate is based on the total circulation, the only advertiser who gets full value is the manufacturer of a product of universal use and universal distribution. No automotive manufacturer gets this full value. The one who most closely approximates it is the manufacturer whose channels of distribution coincide with the circulation of the magazine. Assuming that a large manufacturer enjoys this position, then it follows that the smaller automotive advertiser, whose total distribution points represent only half the circulation of the magazine, is paying twice as much as the bigger manufacturer for his effective national magazine advertising. That is one of the reasons why some manufacturers are diverting substantial shares of their national advertising from the magazines to the newspapers in the communities where their goods can be bought.

And now to the second question.

It is almost a truism that the most successful manufacturers are the wisest and most careful buyers. In the automotive field, they are those who go out and buy

the best engineering talent available, the best purchasing ability to get the specified materials at the most advantageous price, the best manufacturing skill to fabricate these materials into the finished product, the best selling talent to merchandise the product to the distributing organization, and the best advertising talent to create public interest, demand and acceptance.

Some makers pay more attention to one or more of these factors. Others emphasize the importance of one or more different elements.

Since your advertising runs into big figures—whether you are a large or small manufacturer—it ought to be salutary for you at this time to ask yourself this question:

"Considering the amount of money involved, am I giving as much thought to my expenditures for advertising as I am giving to my purchases of frames, or lamps or tires?

"Am I relying on my advertising manager as confidently and as thoroughly as I am on my chief engineer, my manager of purchases and my superintendent of manufacturing?"

That all manufacturers cannot answer these queries in the affirmative is evidenced by two fairly recent instances.

An advertising salesman had special pages open in the several magazines which he represents. He called upon an advertising agent and told him about them. The agent telephoned one of his clients and relayed the information. Although, apparently, the matter had not been previously discussed, authorization for the purchase of these special positions was given immediately, over the telephone, and the advertising salesman left the agent's office with the contracts. These involved an outlay that would have represented a respectable annual appropriation a few years ago. The advertising manager learned of the contracts after the deal was closed.

The next incident may be even more significant.

A manufacturer instructed his new advertising agency to prepare a year's program of advertising, the appropriation being exactly the same as the previous year. The agent carefully worked out a schedule, with copy suggestions, comprising what he regarded as a more effective campaign than that of the year before.

The advertiser looked over the exhibits and agreed with the agent. He agreed on the theme, the copy, the layouts, the careful choice of media, and the skilful staggering of insertions. He was convinced that it would do exactly the job he wanted done. In fact, he approved the program in its entirety, until he learned that it would not use all the money in the appropriation. The agent was saving more than \$75,000 of the fund.

Did the manufacturer congratulate the agent on doing a so much better job on so much less money?

On the contrary, he sent the agent back to his office to revise the program so as to use up that extra money.

Distribution Data for 20 Nationally Advertised Cars

Car	No. of States in which no sales were made		No. of States in which from 1 to 5 cars were sold		Total No. of States in which not more than 5 cars were sold	
	1926	1925	1926	1925	1926	1925
A . . .	4	0	6	3	10	3
B . . .	6	8	10	4	16	12
C . . .	1	11	7	11	8	22
D . . .	10	9	14	11	24	20
E . . .	7	19	10	14	17	33
F . . .	1	0	4	1	5	1
G . . .	5	5	7	6	12	11
H . . .	1	2	10	4	11	6
I . . .	4	5	9	11	13	16
J . . .	0	0	2	0	2	0
K . . .	3	0	6	8	9	8
L . . .	2	2	6	9	8	11
M . . .	0	0	3	4	3	4
N . . .	3	8	8	10	11	18
O . . .	1	0	2	1	3	1
P . . .	0	0	4	0	4	0
Q . . .	0	1	5	3	5	4
R . . .	1	1	0	4	1	5
S . . .	0	0	0	1	0	1
T . . .	0	0	0	6	0	6
	49	71	113	111	162	182

He wasn't willing to admit, even to himself, that he had spent \$75,000 more than was necessary the year before.

Can you imagine a manufacturer buying anything else that way?

To any automotive manufacturer who may be prompted by these thoughts to give serious consideration to his advertising, the following word of counsel is given:

Talk the whole subject over with your advertising manager.

Talk it over with him in exactly the same way that you would discuss designing and engineering with your chief engineer; purchasing of materials with your manager of purchases; production with your production manager; selling with your general sales manager, and financing with your treasurer.

You may not have been placing the same reliance on your advertising manager that you have been reposing on these other executives, because, forsooth, advertising is one of those things that everybody knows all about.

But you may be surprised at the highly specialized knowledge of that advertising manager of yours.

You may be amazed at the help he can give you, if you will give him a chance.

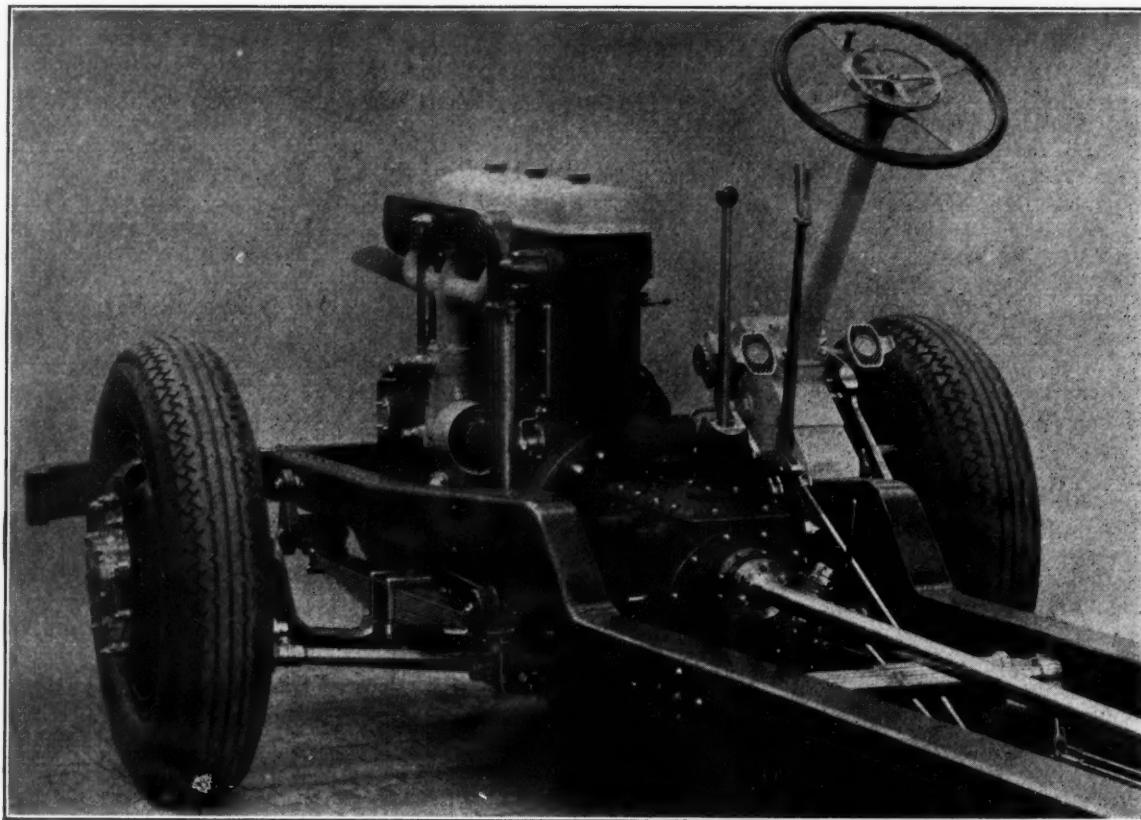
THE Belgian National Industrial Credit Co. has been reorganized recently, chiefly to finance export business of the Belgian industry, and a considerable impetus to exports is expected from this reorganization. The following circular letter, recently sent by the company to interested industrial, commercial and cooperative associations outlines plans of the Society for the future:

"We take pleasure in calling your attention to the fact that as a result of the modifications in our incorporation papers, which were approved by Royal decree on Jan. 14, 1927, the capital of our company has been increased to 150 million francs, with the object of developing particularly the export credit business.

"Now that the stabilization of the Belgian currency has been definitely achieved, it is of the highest importance to facilitate as much as possible the exportation of our products, and to that end it is essential that industry and commerce join hands to compete victoriously in foreign markets, particularly by offering the most favorable terms of payment to customers.

"It is one of the objects of the National Credit Co. to procure the funds necessary to finance such operations, and we consider it apropos to inform you that we are inclined to examine requests for credits on export business extending over periods of two to three years, with the hearty desire to comply with them.

"In accordance with our articles of incorporation, such financing operations are conducted in principle through the intervention and under the guarantee of a bank, a credit establishment or similar institution which meets the approval of the board of directors."



Six-cylinder engine and gear box as used on the new Saurer low-loading bus chassis

Saurer Co. Builds New Six-Cylinder Low-Loading Bus

Latest product of Swiss firm employs 105 hp. engine with aluminum alloy pistons and connecting rods. Wheelbase is 228 in. and single-deck body carries total of 48 passengers.

By W. F. Bradley

THE Swiss Saurer Co. is presenting an entirely new type of six-cylinder, low-loading bus chassis of a particularly interesting type in view of the high reputation held by this firm in Europe. With a wheelbase of 228 in. and a track of 70½ in. front and 67.6 in. at the rear, the total body length, including rear extension platform, is 295 in. and the single-deck bus body built on this chassis will carry 48 passengers (24 seated and 24 standing).

Saurer makes use of a narrow frame, of uniform width throughout, the maximum depth of the side rails being 11 in. and five cross members serving to unite them; the front cross member serves the purpose of bumper. The frame has a pronounced kick up over the front axle and a kink over the rear axle, the height of the top edge of the frame member above the ground when under load, being 19.7 in. The clearance is 8.3 in. at the front and 7.4 in. at the rear.

An entirely new type of six-cylinder engine having a bore and stroke of 110 by 150 mm. (4.3 by 5.9 in.) is employed and has two points of direct attachment at the rear and one point to the forward cross frame member. Cylinders and crankcase are one casting, with a detachable head carrying vertical valves operated by push rods and rockers from a camshaft in the base chamber.

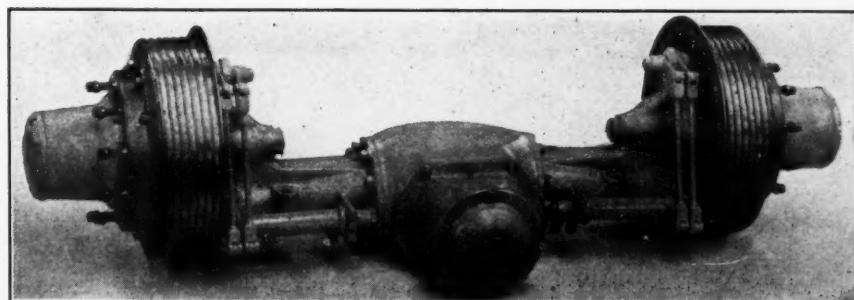
The crankshaft is a built-up type carried in seven ball bearings, and having a damper on its forward end; connecting rods are I-section and pistons are aluminum alloy. Lubrication is full pressure type. The engine is stated to develop 105 hp. at 1600 r.p.m., a centrifugal governor holding it to this speed.

The water pump, the engine governor and the electric generator constitute a single line drive on one side of the engine. Magneto is Scintilla automatic advance type. The clean appearance of the engine is enhanced

by a detachable cover plate over the inclined and recessed plugs on the right-hand side of the cylinder head. A Saurer carburetor provided with an air filter is used, the fuel supply being obtained from a tank on the right-hand frame member. The radiator fan is positively driven through an intermediary from the crankshaft.

Forming a unit with the engine, the combined clutch and gearbox is carried on four studs only, for ease in removal. There are four speeds and reverse, with central change speed and brake levers and an air pump for tire inflation driven off the box. The drive is taken from the engine by an open propeller shaft through the central cross frame member and by a second shaft to the special double reduction rear axle. The three universal joints are of the metal type and both torque and drive are transmitted through the underslung, outboard semi-elliptic springs.

The first drive in the rear axle is by spiral bevel gears, with a reduction of 31 to 10, and the second reduction from the differential shafts to the wheel shafts is by helical gears with the ratio of 37 to 11. The rear axle has two brakes side by side, one set being connected with the front pair and the other set being operated independently by hand. In addition to the mechanical brakes



Saurer double reduction rear axle

is mounted on the right-hand frame members, the design provides for it being placed on the left whenever necessary.

Tire equipment consists of 40 by 9 in. low pressure pneumatics on disk wheels, the rear set being duals. Chassis weight is given as 8100 lb.

At the recent Milan show several new Fiat coaches were presented by Spa, which company is now the truck and coach department of the leading Italian automobile concern. A single deck, 50-passenger bus with entrances on the right hand side only, at front and rear, was displayed. The

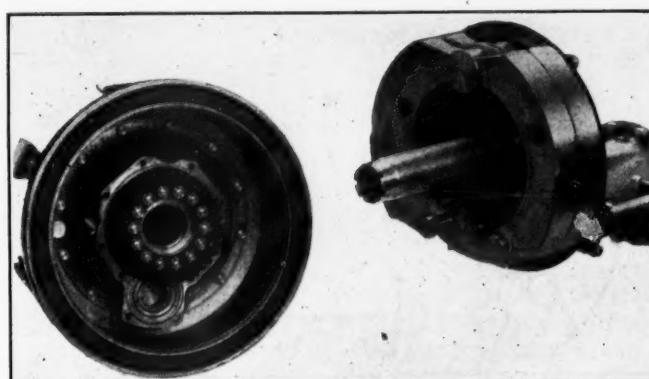
engine used on this chassis is a four-cylinder L-head type of 100 by 140 mm. bore and stroke, forming a unit with clutch and gearbox. Rear axle is a double reduction type (bevel and spur).

A new type of agricultural and road tractor was also shown by Fiat, the modified features being a detachable head overhead valve engine of 90 by 140 designed to run either on gasoline or crude oil.

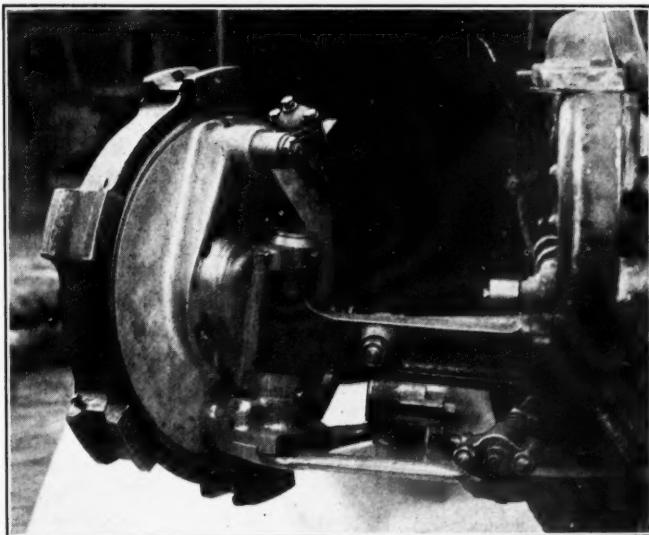
The Pavesi tractor, a special four-wheel drive machine designed for cross-country work, is now a Fiat production. Although this has been in existence for some time, it was comparatively recently that Fiat took up the rights and made some changes in the design. It is understood that the Army has secured the whole of the output.

THE firm of *Carburants et Produits de Synthèse* has been organized in France to develop processes for the manufacture of motor fuels and similar products from native raw materials, coal and lignite. It has been incorporated with a capital stock of 5,000,000 francs, which can be increased to 25,000,000 francs by a vote of the board of directors. Practically all of the coal mining concerns in the northeast of France are said to be interested, these having an annual production of 37,000,000 tons.

At the organizing meeting, M. Cuvelette, general manager of the Lens mines, who is chairman of the new company, said the coal industry was undertaking the highly national problem of the manufacture of motor fuels from raw materials under its control in a spirit of cooperation with other industrial groups. The word monopoly had been used in connection with the undertaking, but he wanted it understood that the promoters realize that difficulties of all kinds are to be overcome, and that if there is to be a monopoly it will be a monopoly of risks.



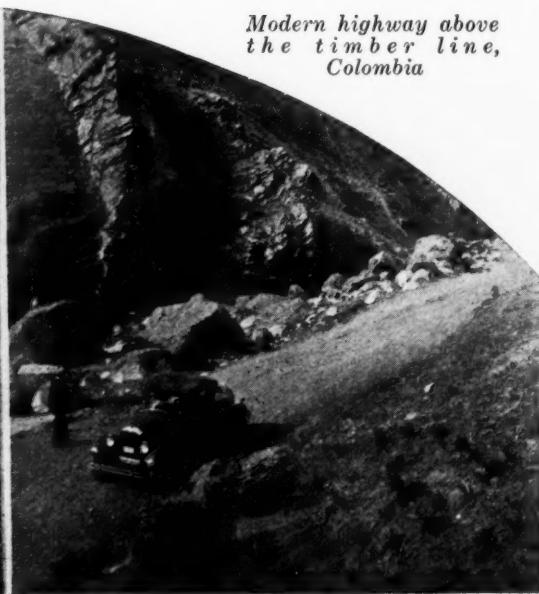
Rear axle drive and double rear wheel brake



Front axle end, front wheel, and brake

the Saurer engine brake is provided and provision has been made for fitting a vacuum servo mechanism.

Front springs are shackled at their forward end and pivoted at the rear, Hartford Silentbloc non-lubricating bushings being used. The front springs are above the axle, while the rear pair are below. Steering arms are bolted to the steering knuckles, instead of the more usual mounting by cone and key. Although the steering gear

A ticklish curve in the Andes, Peru*Modern highway above the timber line, Colombia*

More Roads—Then More Automobiles in South America

Future growth of business in southern countries depends on highway development. A review of what is being done.

By Frederic Daniel Grab

SOME conception of the state of highway development in South America today may be formed from a comparison of the situation of the average large city there with that of even a small town in this country.

Here, of course, a dweller in most any hamlet may get up almost any morning in the year, pack his family and such of his goods and chattels as may be convenient into his automobile and set out for New York, San Francisco or New Orleans, with reasonable expectancy of being able to drive over fair to excellent roads all the way, and furthermore, of being able to follow a fairly direct route to his destination.

In Argentina, which is at least as advanced a nation in every respect as any other in South America, the motorist's tours are limited to a radius of not more than 100 miles around the city he starts from. If he wants to go farther, he must leave his car behind—or ship it on by freight. It is a not uncommon practice for a wealthy citizen of Buenos Aires, for instance, who wants to do some touring in another part of his country, to send his motor car by rail to the vicinity in which he wants to drive. Thus, if roads of the United States were in a state of development comparable to those of the Argentine, a New Yorker who wanted to motor in and about the national capital would have to send his car to Washington by freight and, when it was unpacked and delivered to him there, he could

expect to find passable roads only in the immediate vicinity of the District of Columbia.

What such a situation means in the economic development of Latin America is not hard to appreciate.

It is natural that automotive interests in the United States should be tremendously interested in the building of adequate roads in the Latin American countries. Already, with such roads as are in existence there, the southern continent has become a highly important export market for all classes of American automobiles. Statistics compiled by the Department of Commerce tell a part of the story. According to its data, 193,419 automobiles, buses and trucks were in use in the 20 republics of Latin America on Jan. 1, 1923. On the same date in 1924, the total had grown to 204,664; in 1925, to 284,550, and in 1926 to 399,164. Unofficial but authoritative estimates of the total number of motor vehicles in Latin America on Jan. 1 of this year place the figure at 487,472, an increase of 88,308 over the previous year.

The increase last year was less than it had been between Jan. 1, 1925, and Jan. 1, 1926, when it reached the high figure of 114,614. It may be that further proportionate increases in the number of motor cars will have to wait for general extensions of the highway systems, for with private touring and inter-city bus and truck transportation at present out of the question,

according to the North American conception of those activities, the need for new motor cars cannot develop as it would otherwise.

The automobile manufacturers of the United States would be justified in working for better roads in Latin America even in the most unlikely event that the nations affected should begin to use automobiles of their own manufacture, or those made in Europe. For the prosperity of Latin American nations today, with only the rudiments of highways, is but a hint of what will come when motor transportation has been developed to a point comparable with that of the United States, or even Europe.

With more money to spend as new sources of wealth are made available through better transportation, our southern neighbors would have to increase their purchases from the United States of every commodity in whose manufacture this nation has a comparative advantage. Such prosperity would thus be strongly reflected here and, even if the automotive industry did not sell directly to Latin America, it would have its reward in increased domestic business. Of course, the hypothesis that the southern nations might stop buying American cars is not to be taken seriously.

The automotive industry has quietly but effectively been cooperating in every movement for better roads in Latin America. Back in 1923, the fifth international conference of the Pan-American states, at Santiago, Chile, passed a resolution calling for an official Pan-American Highway Congress. When word of this reached Washington, it was discussed by officials of the Commerce and Agriculture departments, the Pan-American Union, and the Inter-American High Commission. As a result, selected representatives of each Latin American republic were invited to come to the United States before the conference, in order to make a first-hand survey of the problems and influences of a developed system of modern transportation.

The delegates came in June, 1924, and after the official welcome of the United States Government had been given them in Washington by President Coolidge, Secretary of State Hughes, Secretary of Commerce Hoover and other dignitaries, they set off on a month's tour of the highway systems of North Carolina, Illinois, Minnesota and Wisconsin, also catching glimpses of roads in other states.

To most of these visitors, what they saw of North American roads was a real revelation and already has had its effect on more than one national highway program in Latin America. This tour was to a large degree under governmental auspices. The Highway Education Board, a semi-official organization, was in charge. But the money that made the program possible did not come from public funds of the United States; it was contributed by hard-headed business men, the automobile companies, of course, willingly shouldering more than their share of the burden.

An outgrowth of this meeting was the organization of the Pan-American Confederation for Highway Education, with branches in every country of the Pan-American Union actively engaged for the last two years in emphasizing in every way possible the benefits to be derived from good roads.

The delegates to the congress of journalists in 1925, editors and publishers from the southern hemisphere, were taken on a highway inspection tour almost as extensive as their compatriots had made the previous year.

An active delegation officially represented the United States in the first Pan-American congress of highways at Buenos Aires and Congress has appropriated \$15,000 for similar participation in the next highway Congress, at Rio de Janeiro. The commercial attaches and trade commissioners of the Commerce Department's foreign service in Latin America are lending their efforts to promoting the success of the highway movement in every legitimate way.

With all this activity on the part of this country, the greatest care must be taken lest it be misunderstood in Latin America. Any suggestion of a patronizing attitude among those in the United States who are interested in the movement would, obviously, be keenly resented. So advice or other help is rarely given unless it is asked; then it comes immediately and generously, for in this connection it is well appreciated by those concerned that an attitude of the purest altruism will pay best, even from a selfish standpoint, in the long run. Latin Americans who are shown the North American highway systems are told, perhaps, even more about the mistakes that were made here when conditions were somewhat similar to theirs, than they are about the feats of engineering genius, which usually speak for themselves.

The Latin American nations, for the most part, have leaders who are as wide awake as any one in this country to the need for adequate highways. Their problem is in educating the more lethargic masses of their fellow countrymen to a realization of the necessity and in learning, themselves, the best methods of planning and building roads. That is where the United States is helping.



A road near Tampico, Mexico

American republics with a project which will, on completion, provide complete intercommunication between its cities and also outlets to the adjacent republics of Guatemala and Honduras.

The 1927 budget of the Argentine Republic has an item of 20,000,000 paper pesos (\$8,400,000), for road

Already, in some of the southern republics, comparatively ambitious highway programs are in contemplation or actually under way. Cuba leads, with its project for a great central highway, to link all the important cities on the island. In Colombia, a contract was recently signed for construction of a 300-kilometer macadamized road from the interior to the sea coast. Salvador leads the other Central

and bridge construction, as compared with 15,951,000 pesos in 1926. Before that, the appropriation for this purpose never had amounted to as much as 10,000,000 pesos.

The Mexican government has undertaken a construction program that comprises a road from Laredo, on the Texas border, to Mexico City, a distance of 780 miles, and other roads to connect some of the principal cities with the capital. This will include Acapulco, on the west coast, a city with one of the finest harbors in the world, but now without either a railroad connection or a highway to the interior.

Work is Beginning

The work of building good roads in Latin America is beginning. But the problems to be faced are not simple and the distance to be gone is a long one.

Except among those who have actually traveled in the Latin Republics to the south, few Americans have any sort of accurate conception of the actual state of road development in those countries. For instance, every so often, some enthusiast will write Government bureaus here for data that would be helpful on a contemplated motor trip to South America. And it usually is hard to convince these would-be pioneers that under present conditions it would be about as feasible to drive an automobile from the United States to any part of its neighboring continent as it would be to pilot an airplane from the earth to the moon.

How long this will be the case, it would be most unwise to predict. There are some who believe that the barriers of swamps, jungles and mountains in Central America and the northern portion of South America, never will be crossed by passable roads. On the other hand, some who have studied the matter say that the ideal of a "Great Pan-American Highway" will be realized within a decade. They emphasize that 25 years ago the dream of a trans-continental highway for the United States seemed to most persons even less practical than the other does today.

Meantime, the pressing highway need in Latin America is not a great international road, linking the nations of the two continents. It is simply the construction of adequate roads between capitals and seaports, on the one hand, and habitable parts of the same countries, on the other.

Methods of Improving Cast Iron

TWO methods have been employed recently in attempts to improve the structure and mechanical properties of cast iron—overheating and shaking. It has been shown by Piwowarsky that overheating to a certain degree results in a reduction of the graphite content, while above the critical temperature the graphite increases again. The possibility of reducing the graphite to a minimum is of the highest importance. Several metallurgists in recent years have pointed out that cast iron of pearlitic structure, such as the Lanz Pearlite iron, possesses especially good mechanical properties.

Pearlite is an eutectoid of ferrite (pure iron) and cementite (iron carbide). The result of heating the iron to this critical temperature seems to be that the graphite passes into solution or into combination and coarse graphite needles no longer deteriorate the structure of the iron.

The observations of Piwowarsky were confirmed by Fritz Meyer, who reports his extensive research work on the subject in *Stahl und Eisen*. In 11 out of 13

series of tests it was clearly shown that within a certain range of temperatures, between about 2590 and 2750 deg. F., the graphite formation is a minimum and the carbide content a maximum, while at the same time the graphite flakes become finer. An increase in the temperature beyond this range causes the graphite formation to increase again. The critical temperature, at which the decrease in graphite content stopped, was clearly discernible in eleven cases, while its absence in the other two cases is ascribed to gas inclusions in the melt.

It has been asserted recently that the Dechesne process of improving the structure of cast iron by shaking or jolting the molten iron in the cupola was antedated by the process of Streck during the latter part of the nineteenth century. This has led to a reply from Irresberger to the effect that although it is true that Streck was the first to use the shaking process, he had an entirely different object in view than Dechesne. Streck's object was to cause the impurities of lower specific gravity than iron to rise to the surface, and thus to purify the bath. Dechesne, on the other hand, shakes the molten iron in the forward hearth of the cupola and achieves to a considerable degree the destruction of the graphitic nuclei and a finer division of the sulphur content. His melt is therefore very homogeneous. Since the jolting takes place in the forward hearth of the cupola while additional molten metal is constantly added, it is not necessary to overheat the iron. With the Streck process it was necessary to stop the shaking with iron that was not over-heated, after only 4 minutes, as the iron otherwise became too cold for pouring.

Oldsmobile Merchandising Course

ACOURSE in automotive merchandising has been started by the Olds Motors Works as a means of laying the foundation for a group of trained men who will have practical and theoretical training in the more important phases of the industry—production, service, wholesale and retail selling.

At the conclusion of the college year last spring, nearly a score of university graduates were given apprentice positions with the Oldsmobile organization. During the past year they have received practical training and instruction in engineering and production methods at the Oldsmobile factories. Eight of these graduate apprentices have been selected for further sales training and at the completion of their year's training in the factory they are being given intensive instruction and practical experience in the selling of automobiles. This will be followed by a period of six months actual retail selling experience in Oldsmobile branches, and an equal period as factory representatives in the wholesale field. It is expected that the course will be completed next spring.

The factory instruction course now being given covers sales and service methods, from the receipt of cars in the field to the actual sale to the consumer. Sales policies, the operation of the General Motors Acceptance Corp. and the Oldsmobile Six Per Cent Certificate plan are thoroughly studied.

When this second year of training is complete the men will have a close and practical knowledge of automobile merchandising. Their training will have included a regular college course, with engineering studies; one year of practical factory work in production departments, six months selling in the retail field and the same period in the wholesale division. Supplementing this is the instruction and supervision given from time to time by factory executives covering each phase of the training.

Just Among Ourselves

Road to Success Has Many Bypaths

THE old adage, "You can't do two things at once," has long since been given the lie by modern business and industry. Today an automotive concern has to do not two things but three or four things at once to be successful and get anything like maximum profits. As a matter of fact it is just that tendency to do one thing at a time that has handicapped many companies severely. Often, for example, we have seen the spectacle of a company being organized, a special type of product being designed and the first units of the new product built. Then apparently for the first time serious and detailed study and thought are given to finding out the probable market for the product, the best ways of distributing it and the most effective ways of selling it in general or how it will fit with other units made by the same company from a sales standpoint.

* * *

Market Analysis Should Come First

SOMETIMES it has even been discovered shortly after reaching this market analysis point that the particular type of unit designed and built didn't fit into any large part of the market. If only one thing is to be done at a time, it probably would be better to have the commercial investigation precede rather than follow the detailed designing of the product, but usually the best way has been found to be to work out the marketing, designing and production phases of the venture simultaneously, so that the newly discovered necessities of each phase may be used to check and balance the developments in the other phases as the

growth of the business unfolds. But to get this balanced point of view in the beginning and then to maintain it in a practical way through development stages isn't one of the easiest problems, by a long shot.

* * *

Practical Men and Practical Methods

IDEALS undoubtedly have a very real place in the development of modern business. We've often questioned the place of idealization, however, in that same process. Actual hard work, mental and physical, frequently has been discouraged rather than promoted by the very human tendency inherent in most of us to visualize ourselves as something which we aren't quite. We've been to meetings where many editors convened and listened to various definitions of what constituted a business paper editor and come away on more than one occasion softly murmuring "Applesauce." We've known too many men who did a fine job without the necessity of visualizing themselves as some sort of super-men. The big things that the automotive industry really has accomplished, we think, are the result to no little extent of the very practical way that automotive men have of looking at themselves and their fellow workers. A good job well done usually is recognized as such and spoken of in just such terms. Read an article recently in which the automotive production engineer was characterized as "a man of science who figures cause and effect, utilizing a scientifically selected means to accomplish predetermined results." Maybe he is, but it's hard for us to think of the hard-headed, free-speaking, practical sort of fellows we meet in our journeys around

the factories in these particular terms. Still, we suppose a rose by any other name

* * *

Popularizing the Back Roads

AS the days grow warmer the roads get more crowded. The traffic problem, which, it is recognized, is every year becoming more of a sales resistant, reaches its most acute stage in the summer days of each year. Despite the thousands of miles of fine highway in the United States, it sometimes seems to the automobilist that every available inch is taken up with cars; that driving is just stopping and starting or dodging in and out of traffic lines. Particularly does this seem to be the case on Saturdays and Sundays. Among the many efficient methods of alleviating this condition and directing the flow of traffic to keep it moving, one in particular appeals to us as never having had sufficient emphasis, especially in recent years. Far more strenuous efforts, it seems to us, might be made toward getting people to sense the joys of back road and country road travel on week ends. Special advertising campaigns might be put on to this end. Scenic beauties, lack of congestion, freedom from interference by other drivers—all of these things are among the pleasures peculiar to haunting the unused road. We've tried it and can recommend it heartily. Such a week-end leaves one infinitely more rested physically, calm mentally and uplifted spiritually than does similar time spent fighting the traffic on the main highways. So far as speed is concerned, 20 to 25 m.p.h. is easily possible on thousands of secondary roads and that is the average at which many drivers on main roads seem to want to travel anyhow.—N.G.S.

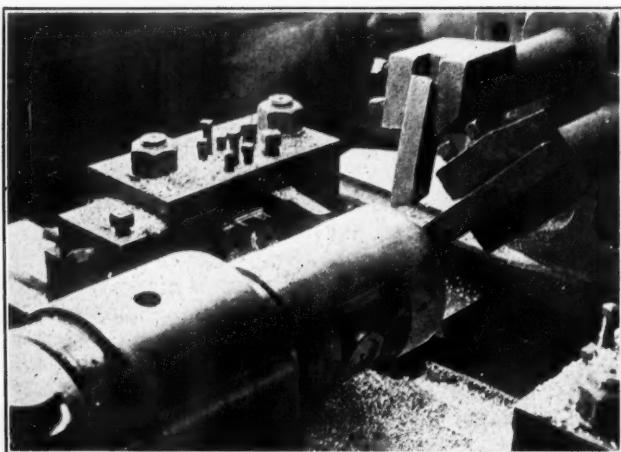
How Autocar Aluminum Crank Train is Machined and Assembled

50 operations required to machine and assemble piston, pins and connecting rods for high speed Type A engine. Broaching of connecting rod bearing allows fitting without scraping.

By K. W. Stillman

In the Type A engine which is fitted in the high speed delivery truck recently developed by The Autocar Co., aluminum pistons and connecting rods are used to reduce reciprocating weights and make operation smoother at the relatively high speeds at which the engine runs.

There are 50 operations in the machining of the piston, piston pin, connecting rod and assembly of the three



Autocar aluminum piston set up in Potter & Johnson automatic where head end is faced, outside diameter rough turned, ring grooves roughed out and head end centered

—16 for finishing the piston, 18 on the connecting rod, nine on the pin and seven assembly operations.

The first operation on the piston consists of boring and facing the open end of the rough casting on a Bardon & Oliver screw machine. This provides an indexing surface for placing the casting in a Potter & Johnson automatic where the head end is faced, the outside diameter rough turned, the ring grooves roughed out and the head end centered.

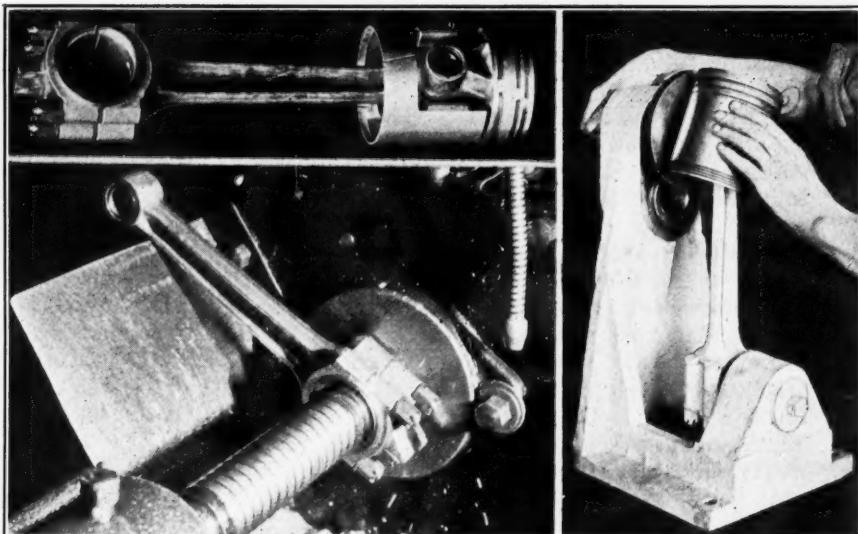
Then the casting passes to another Bardon & Oliver screw machine where the piston pin holes are bored and reamed preparatory to grinding. After this come three drill press

operations in which two $\frac{1}{4}$ in. holes are drilled in the expansion bosses, two $\frac{3}{16}$ in. oil holes drilled in the piston pin bosses, and the locking ring grooves in both piston pin bosses recessed.

On a hand miller, small slots are milled in both piston pin bosses for removal of the locking ring and next, on a drill press, oil grooves are cut in the piston pin hole. The ring grooves are finished on a lathe and the outside diameter is finish ground on a Brown & Sharpe grinder. After this operation the piston is inspected for outside diameter and then goes to a lathe where the head end is finish faced. The piston pin holes are finish ground on a Bryant internal grinder. The last operations, prior to final inspection, are to saw expansion slots in the open end and between the head and skirt, which is done on a milling machine.

The first operation of the aluminum connecting rod is to bore a hole in the large end with a drill press, which provides a locating medium for milling the face of both bosses on both ends. Next the hole in the small end is drilled and reamed at a drill press preparatory to broaching, which is the next operation.

Four $\frac{7}{16}$ in. bolt holes are next drilled and reamed and the large end is drilled and reamed and then broached. Oil holes are drilled in the cap and the oil dips are formed in a milling machine. A milling ma-



Above—Aluminum piston and connecting rod assembly used in the Autocar Type A engine. Left—Main bearings are broached in this machine to give perfect fit without scraping. Right—Testing alignment of piston and connecting rod assembly

chine is again employed to form the oil grooves and the small end. A hand miller is used to mill the clearance on caps for the nuts and to form the oil slot in the small end of the rod.

The next operation is to face and split the large end on a milling machine, after which the four bolt holes are countersunk and hand reamed. Then the cap and rod are burred and wired together prior to the final inspection.

A Gridley automatic is used to rough turn the outside diameter of the piston pin and bore it half way through, while the hole is finished and reamed and both ends centered on a screw machine. The pin receives an inspection after these operations, after which it is heat treated.

After heat treatment the outside diameter of the pin is rough and finish ground on a centerless grinder to limits of .0002 in. After a lapping operation the pin is ready for final inspection.

The first operation in assembling the unit is to press the bushing in the piston pin hole. An interesting feature of this is that the pin is full floating, being retained only by locking rings at either end. This practice is designed to give much better life for the pins since the wear is distributed around the pin instead of being concentrated on one point.

The piston pin hole bushing is hand reamed but the connecting rod bearing is broached, as is the relief in the bearing. This results in a practically perfect bearing which may be fitted to the shaft without scraping and also tends to compress and harden the bearing surface. The next step is to face and form the radius on the bearing, after which the connecting rod, pin and piston are assembled, straightened on the fixture shown in an accompanying illustration.

"Pearlitic" Cast Iron

A GOOD deal has been written recently on the use of "pearlitic" cast iron for engine castings, particularly Diesel engine castings in Europe in recent years. Additional information concerning the nature and properties of this iron is conveyed in the Thirty-third James Forrest lecture entitled "Some Recent Services of Metallurgy to Engineering," by Prof. H. C. H. Carpenter. According to Prof. Carpenter, the high-carbon iron-carbon alloys solidify "white" unless a particular stimulus is present to cause the precipitation of graphite. They consist accordingly of cementite and pearlite. Since "white" iron is so hard as to render it incapable of being machined, its use is greatly restricted in mechanical engineering work. The addition of silicon, however, causes the formation of free carbon from such a white iron, and it is possible, in certain favorable conditions, including slow cooling, to produce a cast iron consisting only of silico-ferrite and foliated coarse graphite. Such a material is very weak, although soft, and apart from a few special cases, such iron is but little used for mechanical engineering work. Between these two limiting conditions come the usual technical kinds of grey iron. Their microstructure depends on the smelting and casting processes used, the conditions of solidification and cooling after casting, and upon the chemical composition. The rate of cooling is, of course, considerably affected by the cross-sectional area of the particular casting. In the microstructure of ordinary grey iron are usually found together varying quantities of graphite, silico-ferrite, pearlite, free cementite and the phosphide eutectic, together with inclusions of iron and/or manganese sulphide.

A carbon steel containing 0.9 per cent. of carbon consists, when annealed, only of eutectoid pearlite, the structure being uniform and dense. This material is pure steel. It has, as is well known, very remarkable mechanical properties. The problem of improving the qualities of cast iron consists essentially in preparing a material composed mainly of pearlite with deposited graphite. A cast iron of this kind would certainly be superior in properties to any of the ordinary varieties, and it might be expected to exhibit mechanical properties approximating to those of pearlitic steel, which would be influenced only by the graphite. Numerous tests carried out by different investigators on castings approximating to the above structure bear out this view. It was at first not found possible to get the desired structure in current practice. Diefenthaler and Sipp were, however, able to devise a process to enable this structure to be obtained regularly. It was patented in 1916.

It consists essentially in the proper regulation of the furnace charge and the correct heat treatment of the molds. Correct mixing is intended to give as little stimulus as possible to the formation of graphite. The materials used are carbon, silicon and low phosphorus pig iron. It is also a remarkable fact that a high sulphur content, which most foundrymen fear more than anything, does not appear to be detrimental to pearlitic cast iron. When cooled in the ordinary way, an iron of this kind would solidify "white." In order to produce the desired pearlite-graphite structure, a slow rate of cooling is necessary, and this is obtained by pre-heating the mould. The degree of pre-heating depends, of course, upon the wall thickness of each particular casting. Theoretically speaking, it should be possible to get from one and the same charge and by suitable heat treatment of the mould, every desired cross-sectional area with the same final product—pearlite-graphite structure—when once the rates of cooling for the different cross-sectional areas have been determined. In practice, various cross-sectional areas are grouped together and a special burden or charge selected for each group, assuming the same amount of pre-heating of the mould.

The properties claimed for the cast iron are—(1) High transverse and tensile strengths and toughness; (2) high resistance to impact stresses; (3) moderate hardness when properly treated; (4) only a slight tendency to the formation of "pipes," and hence the possibility of making complicated castings; (5) great resistance to sliding friction (abrasion); (6) fine and dense structure, the structure being unaffected by temperature changes.

MICHIGAN State College has instituted a course in Industrial Metallurgy, the purpose of which will be to instruct students in the uses of metals and alloys rather than in their production. The first two years of the course are identical with the mechanical engineering curriculum while the last two years are devoted largely to intensive study of the various metals and their uses. A fifth year of study is also available to those who wish to go still deeper into the subject.

The school is very well located in the center of an industrial region and the laboratories are well equipped for giving instruction and practical demonstrations in industrial metallurgy. In addition, an attempt is to be made to get the cooperation of various industries so that class room and laboratory work may be amplified during vacation periods by actual factory employment.

Light is Thrown on Spring Design by Use of New Strain Gage

Principal stresses in leaves accurately measured instead of being calculated as heretofore. Instrument and results obtained with it are described in S.A.E. paper.

A NEW method of investigating the stresses in leaf springs under load and of designing springs on the basis of the results of such tests are discussed in a paper recently read before the S.A.E. Detroit Section by Tore Franzen, assistant chief engineer of the Detroit Steel Products Co., Chassis Spring Division, the paper having been prepared in collaboration with S. P. Hess and Clark A. Tea.

The principal stresses in spring leaves are those due to bending, and these always have been determined by calculation, but now they can also be accurately measured. The instrument used for this purpose, a recently developed strain gage, is illustrated in Fig. 1. It has one fixed and one movable point, and these points are pressed against the surface to be investigated. When the spring is placed under load, opposite surfaces of its leaves contract and expand, and resulting changes in the distance between the two points of contact are multiplied by the leverage system of the instrument in the proportion of 300 to 1. Each division on the scale of the gage represents a stress of 4000 lb. p. sq. in. The dial is read with the aid of a mirror held under the instrument. Fig. 2 shows a chassis spring in the conventional testing machine and subjected to load, with two strain gages attached.

Fig. 3 shows six springs, all of different design. Of these the one marked No. 4 is of conventional design, having a main plate somewhat heavier than the others, and steps of equal length between the eye and the edge

of the 4-in. seat. A side view of this spring and test results from it are given in Fig. 4. The portions of the leaves shown shaded in the drawing are in excess of the lengths required for uniform stress distribution, which implies leaf lengths directly proportional to the moments of inertia of the respective leaves. In all of the tests, stresses were determined by means of the strain gage for 2, 4, 6 and 8 in. deflection at points along the main leaf 2 in. apart.

In this design the stresses are very poorly distributed, for, as may be seen from the chart, when the stress approaches 120,000 lb. at the center, it is only about one-half of that amount 4 in. from the eye. In the lower portion of the chart is shown a curve of the negative stress in the main plate, caused by assembly nip or pull. This stress in this particular case is 10,000 lb. near the center, and gradually diminishes to nothing about 16 in. further out, these figures representing fair averages for the rear springs of small passenger cars.

The spring in Fig. 5 is of exactly the same grading as that in Fig. 4, but the lengths of the leaves are proportional to their moments of inertia, except in the cases of Nos. 2 and 3, where the shaded areas represent additional lengths. It will be noticed that in this case the stress curves are flattened out considerably, and the difference between minimum and maximum stress is

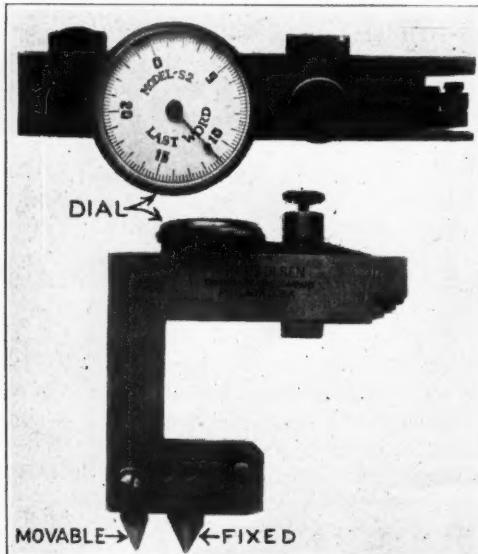
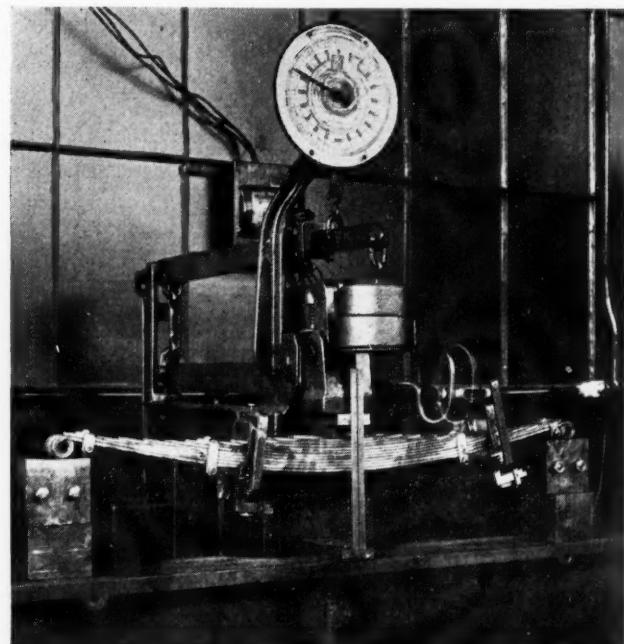


Fig. 1 (Left).
Olsen strain
gage

Fig. 2 (Right).
Spring in testing
machine under load
with two strain
gages in position



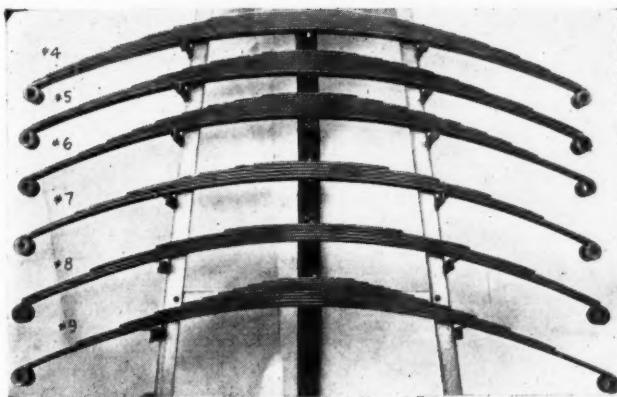


Fig. 3. Six springs of equal flexibility but different design

less than half that in Fig. 4. If the metal represented by the shaded portions of Fig. 5 were removed, the spring (No. 6 in Fig. 3) would be of little commercial value.

From data obtained in tests of the kind of which results are plotted herewith, the conclusion is drawn that it is desirable to so design leaf springs that the plate lengths are proportional to the moments of inertia of the plate sections, except for strengthening near the eyes to take care of rebound.

The strain gage is particularly valuable for determin-

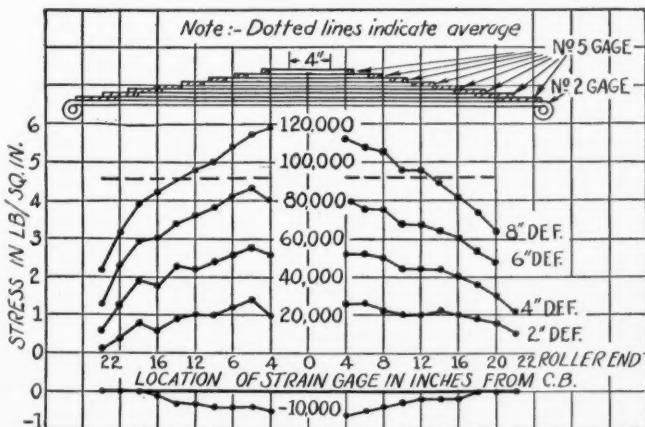


Fig. 4. Strain diagram of spring No. 4

ing stresses due to torque reaction. In Fig. 6 a spring is shown subjected to a direct load and in addition to a torque. With the aid of results from such tests it has been found possible to design springs which will effectively resist torque. Special provision against torque stresses is seldom required for rear springs, but is commonly made in front springs of cars having four-wheel brakes. In conventional front springs, between 36 and 40 in. in length and eccentricated 1 to 1½ in., the point of maximum stress due to torque lies about 8 in. back of the center of the axle. Fig. 7 shows a spring in which the rear end is strengthened by the addition of an extra plate.

There is much difference of opinion among spring engineers on the subject of interleaf friction. The author's firm for years has advocated the use of multi-leaf springs, and to substantiate its views it carried out the research work dealt with in the following.

Tests made in a simple machine showed that the coefficient of static friction between dry steel surfaces is 0.35 and the coefficient of sliding friction 0.22. With a given pressure between the plates, the total friction

is directly proportional to the number of surfaces on which sliding occurs or can occur.

Results of tests made on lubricated surfaces are plotted in Fig. 8. The loads were applied to plates of 25 sq. in. area, hence unit loads may be found by dividing the total loads by 25. Friction was a minimum with a lubricant consisting of equal volumes of cylinder oil and powdered graphite. The close proximity of the curves for static and sliding friction with this lubricant is particularly noteworthy. When the pressure is made sufficiently great, the curves for static and sliding friction will meet. With graphite lubrication this occurs with a specific pressure of 1¾ lb. p. sq. in. Beyond that

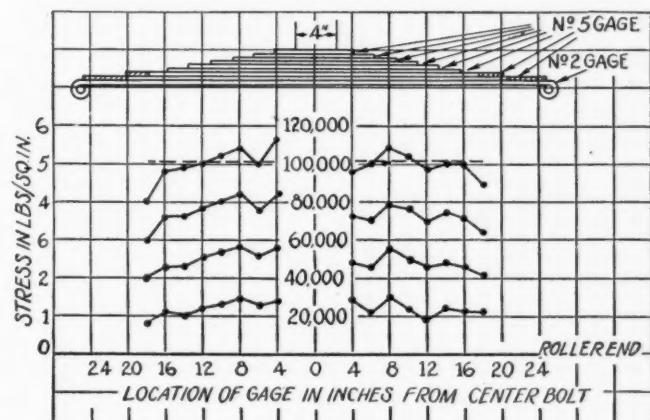


Fig. 5. Stress diagram of spring No. 5

pressure there is a peculiar diversion, which is due to the pressing down of the thick film, while further on the curves coincide again.

The important conclusion that may be drawn from these tests is that with graphite the coefficient of fric-

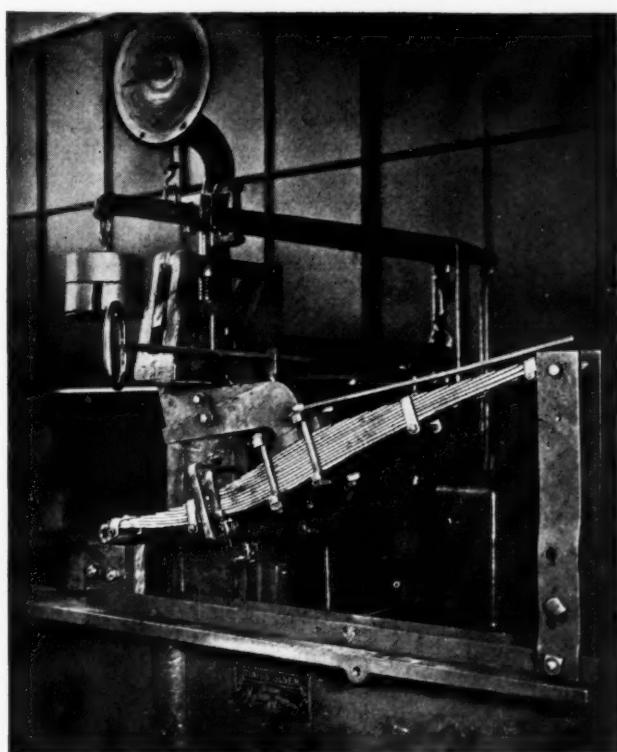


Fig. 6. Spring under combined direct load and torsion



Fig. 7. Front spring designed to resist brake torsion

tion is substantially constant. In conventional practice graphite is applied sparingly between leaves.

In order to study the vibration characteristics of different springs, the testing machine (Fig. 9) was built. It can be adjusted to take all ordinary passenger car springs, and the springs are set vibrating in it by means of a weight which is varied to correspond to the normal load. This weight is raised to a certain height by means of a constant-acceleration cam, and is then suddenly released. A graph of the spring oscillation is traced by a pencil on a drum which is driven by a constant speed motor, and for extreme accuracy a tuning fork vibration curve may be recorded on the same drum. For life tests on springs the machine can be operated continuously.

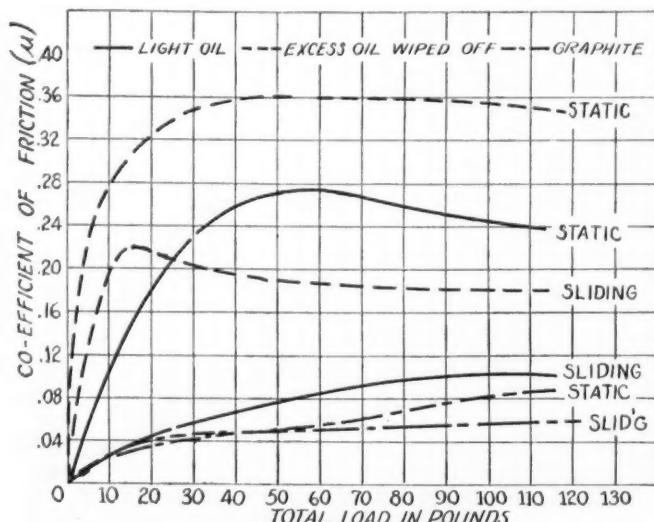


Fig. 8. Friction coefficients for plain steel surfaces variously lubricated

Tests were made on six "dry" springs, all of approximately the same flexibility (300 lb.), with 1, 4, 8, 12, 16 and 19 leaves, respectively, all except the first having the same nip, of 200 lb. The object of these tests was to study the effect of number of leaves on the vibration characteristics. The frictional surfaces were cleaned by sand blasting.

A test was run on each spring in the vibratory machine, the springs being set vibrating by dropping an 800-lb. weight from a given height. After four or five initial oscillations, intended to smooth or adjust the leaf surfaces, a record was made of the oscillations. Next, each spring was calibrated in a static load machine to the maximum deflection recorded in the vibration test, and from the results thus obtained absorption diagrams were plotted, of which Fig. 10 is an example. The area of these diagrams represents the amount of energy absorbed in deflecting the spring to its maximum, in inch-pounds.

In Fig. 11 are reproduced vibration curves of the different springs, and the effect of inter-leaf friction in bringing the springs to a stop is most apparent. Table 1 gives the important data of this test.

It was found from the test results that the number of

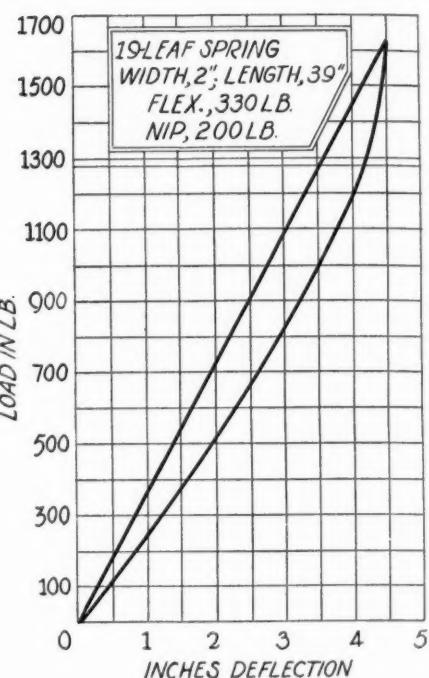


Fig. 10. Energy absorption diagram

periods required to damp a spring may be expressed by the equation

$$y = \frac{2.16}{x^{0.867}}$$

where x is the number of leaves. This relationship holds only for numbers of leaves up to 12, beyond which there is no further decrease in the number of periods.

The theoretical frequency, given in the fourth column, was determined by the equation

$$F = \frac{60}{\pi} \sqrt{\frac{g \times 12}{D}}$$

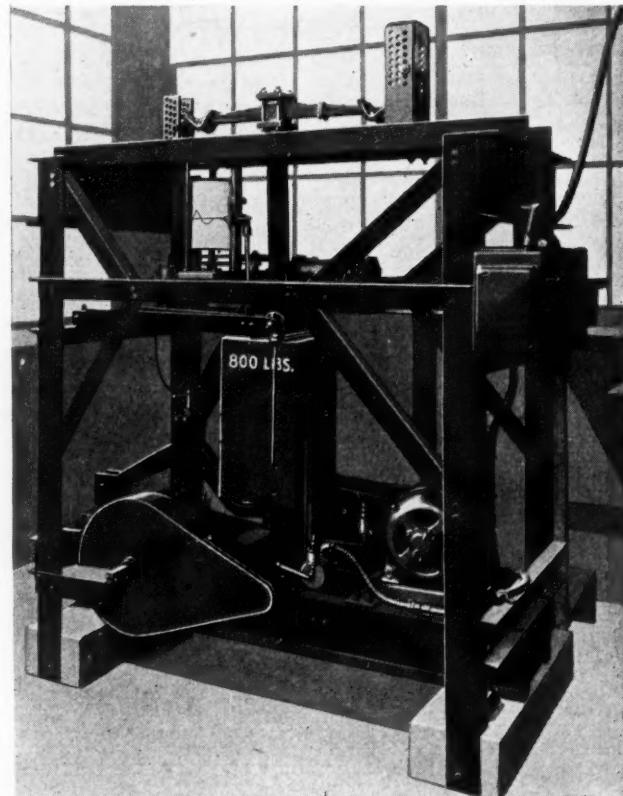


Fig. 9. Vibratory spring testing machine

where F is the number of cycles per minute; D the flexibility, and g the acceleration due to gravity.

TABLE I
RESULTS OF VIBRATION TESTS
Springs With Constant Nip and Flexibility

1. No. of Leaves in Springs	2. No. of Periods	3. Actual Frequency vib. min.	4. Theoretical Frequency in vib. min.	5. Static Absorption inch. lb.
1	21½	116	115	0
4	6½	120.4	116	333
8	3½	118.2	114	424
12	2½	120.7	116	612
16	2½	123	114	784
19	2½	132	121	872

It will be seen from Table 1 that the actual frequency of vibration in each case is higher than the

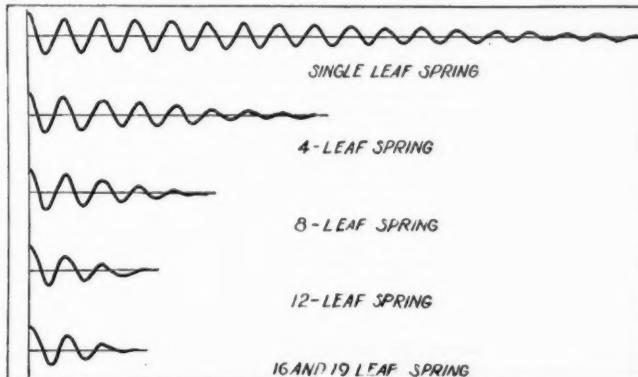


Fig. 11. Damping records of springs with various numbers of leaves

theoretical one. This is due to interleaf friction and in part to shackle friction and machine friction. By introducing a friction constant into the fundamental formula for frequency of vibration, the actual frequency can be very accurately determined. Owing to the interleaf and other friction, the spring deflects less under a given load than it theoretically should, and

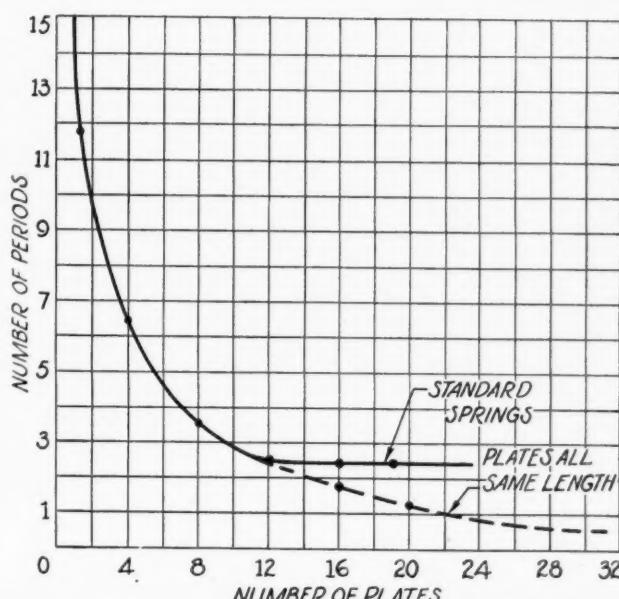


Fig. 12. Curves showing relation between numbers of leaves and cycles in damping period

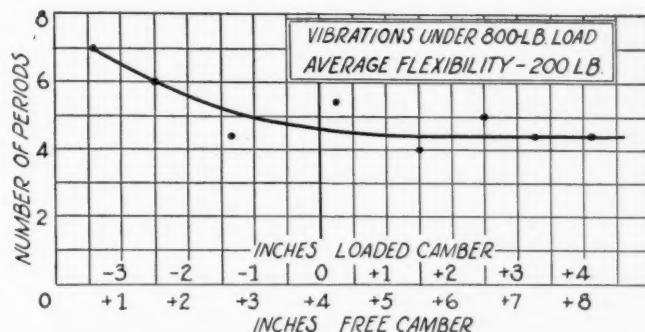


Fig. 13. Curve showing relation between spring camber and damping cycles

by substituting the deflection scaled from the compression line of the absorption diagram at the 800 lb. load point for D in the formula, the actual frequency of vibration is obtained.

The energy absorption of the spring increases continually with the number of leaves, but the only apparent effect of this beyond 12 leaves is to slightly increase the frequency and not to decrease the number of cycles required to damp the spring. Nip affects the damping period relatively little. For instances, in the case of the four-leaf spring, by reducing the nip from 200 to 100 lb., the number of oscillations in damping was increased from 6½ to 7 or 7.7 per cent. The relation between the number of plates and the number of oscillations during the damping period is shown in Fig. 12. In this chart the full line curve shows this relation for springs with leaf lengths graded in the usual way, while the dashed extension shows the effect of making all leaves of full length. Fig. 13 shows the effect of camber on the number of cycles in damping both the loaded and the free camber being plotted along the axis of abscissas.

Paint Spray With Air Purifier

THE latest product of The Alexander Milburn Co., Baltimore, Md., is the Type E-1 siphon-feed paint spray unit which is said to produce so fine atomization of lacquer that sanding and rubbing operations are minimized. The spray is surrounded by an air pocket in order to lessen loss of material and to utilize the entire spray in covering the surface being finished.

The Milburn air purifier is incorporated with the spray gun to insure the delivery of only clean, dry air to the nozzle. The air, upon entering the purifier, passes through a series of double baffles arranged to extract moisture and impurities from the air. The unit is complete with gun, quart container, air conditioner and regulator and 25 ft. of hose and the necessary connection. It is intended for use in all classes of painting service, being adjustable for use with heavy anti-corrosive paints or very thin lacquers and for touching-up and shading as well as for heavy work.

A BULLETIN on Stainless Steel has been published by the Department of Engineering Research of the University of Michigan, the authors being Albert E. White, Professor of Metallurgical Engineering, and Claude L. Clark, holder of the fellowship in metallurgy established by the Detroit Edison Co. It contains an article on the history, properties and uses of stainless steels, abstracts of important articles on the subject and a bibliography. The publication is known as Engineering Research Publication No. 4 and is published by the University of Michigan, Ann Arbor, Mich.

Internal Gear Unit for Transmissions

Developed by Morse Chain Co.

May be used either as an over-speed or under-speed drive in four-speed transmission and can be added to present standard transmissions or used in special design.

By F. C. Thompson

Manager Detroit Branch, Morse Chain Co.

AMONG the most important new developments in automobile engineering is the four-speed transmission, which is creating probably more interest than anything else since the advent of the four-wheel brake. Fifteen years ago many of the larger cars were equipped with four-speed transmissions, which were of the standard spur gear type, and some of these were over-gearred (direct drive on third). Later these over-gearred transmissions were abandoned, because with improvement in the engines and rear axles with respect to quietness of operation, the noisiness of the over-gearred type of spur gear transmission became painfully evident.

The Morse Chain Co. started development work on four-speed transmissions some 10 years ago, as the result of its work on a silent chain transmission which it developed to a point of satisfactory quietness and durability, but which proved unsatisfactory from the weight and cost standpoints. The company's engineers, all of whom have had previous automotive experience, realized the advantages of the four-speed transmission and continued their research and development work, de-

termined to render both of the top speeds sufficiently quiet so that either would be entirely satisfactory from the standpoint of noiselessness.

For more than three years now, work has been under way on the Thompson four-speed internal and external gear unit, which can be used as an over-speed (direct drive on third) or an under-speed (direct drive on fourth) in a four-speed transmission. This unit, which will be described later, can be used in connection with a standard transmission or incorporated in a special design.

It is not the intention of the Morse Chain Co. at the present time to manufacture complete transmissions for passenger cars; what it plans to do is to turn out the special unit in different sizes and ratios, to be incorporated in complete transmissions manufactured by transmission manufacturers or car manufacturers. It also plans to issue manufacturing licenses for this device; in fact, some licenses have been granted already.

There is considerable difference of opinion as to whether a four-speed transmission should be direct on third (over-speed) or on fourth (under-speed). Both

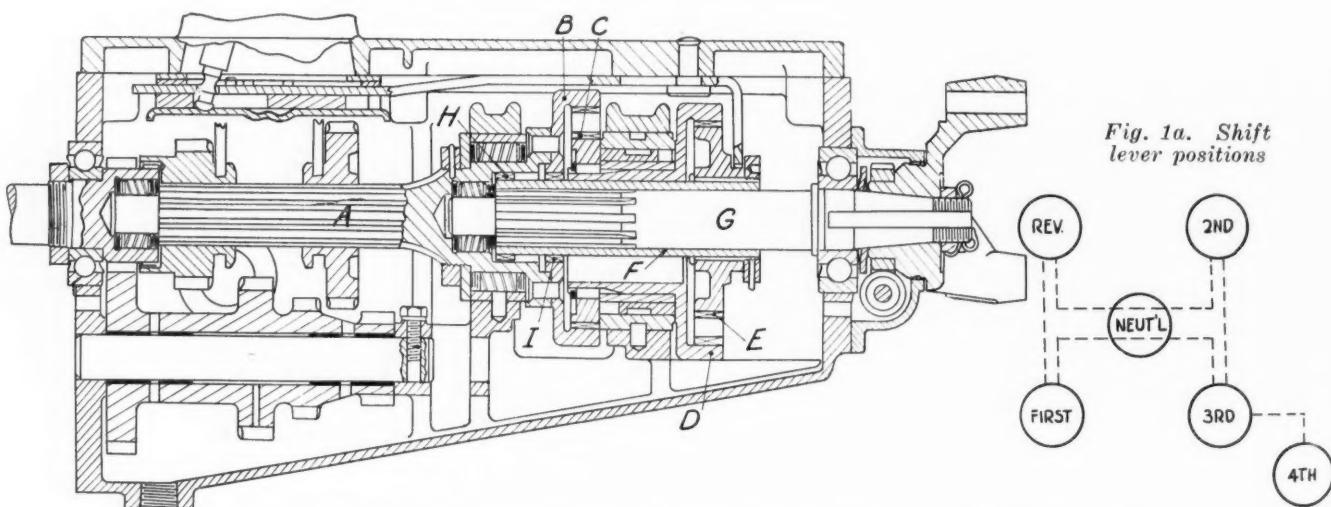


Fig. 1. Morse four-speed transmission with over-drive by Thompson internal gear unit and parts of a standard three-speed gear

designs have advantages and disadvantages. Advantages of the "direct on fourth" are reduced propeller shaft speed and a smaller axle ratio, which makes it possible to get a quieter axle. If the car is over-powered for its weight, and is capable of being handled satisfactorily in traffic with a rear axle ratio of approximately 3.5 to 1, then the direct drive should be the fourth and the internal and external gearing should be used for the third speed, as which it would give quiet operation during acceleration and in hill climbing.

The average modern car is provided with a rear axle ratio of about 5 to 1, which high ratio is necessary to give sufficient acceleration and hill climbing ability, and with such a rear axle ratio the over-speed (direct on third) is much more desirable. The direct drive should then be used for all ordinary driving up to 30-35 m.p.h., and the over-speed as an auxiliary for country driving. With a final drive ratio of 5 to 1 and a 7-to-10 step-up on the fourth gear, the total reduction is 3.5 to 1. This reduces the engine speed 30 per cent for the same car speed, and for the majority of cars it considerably increases the maximum car speed.

This latter type of transmission makes it possible to retain the present type of high speed engine and to cut down its operating speeds. At speeds of from 30 m.p.h. up to the maximum, fuel consumption and wear in engine parts are reduced and the operation of the engine is much smoother, owing to the reduced engine speed. It was also found in the experiments of the Morse Chain Co. that vibration at high speeds is reduced when the crankshaft and propeller shaft rotate at different speeds, as synchronism is then prevented.

After having equipped a great number of different makes of cars of different sizes with four-speed transmissions, the Morse Chain Co. has reached the conclusion that, unless the engine size is to be increased, it is generally preferable to use an over-speed transmission. It has also been found that the internal and external gears operate more quietly at the higher speeds, which makes it more desirable to use the over-speed. As a matter of fact, the over-speed is required to be more quiet in operation than the under-speed, for the reason that with the former the engine operates at lower speeds relative to the car speed, and any noise in the transmission is more noticeable than with the under-speed.

After experimenting with four-speed transmissions on different cars for many years, the Morse Chain Co. has come to the conclusion that the type of transmission which best meets the conditions depends upon the powering. On cars with engine power sufficient to make them handle properly with a 3½ to 1 rear axle reduction, the under-speed type of transmission with direct drive on fourth should be used, and would afford two quiet high speeds. With cars of this type there is some question whether the present first speed should not be eliminated and a three-speed transmission used, with the third speed direct; the second a reduction of about 40 per cent, obtained by means of the internal and ex-

ternal gearing, and the first speed obtained by means of spur gearing in the usual way and used for starting.

The other type of car is that equipped with engines which will handle them satisfactorily from the acceleration and hill-climbing standpoints on a rear axle ratio of 5 to 1. These cars should be equipped with an auxiliary speed—an over-speed—for high-speed driving.

With either type of transmission the indirect high speed must be sufficiently quiet so that it will be used at the speeds for which it is intended. Quietness is largely dependent upon rigidity, which means large shafts that will not deflect appreciably, and large bearings rigidly mounted. The size of the internal and external gears also is of importance. In fact, the gears that operate most quietly are so large that they look entirely out of proportion to the rest of the transmission.

One of the four-speed transmissions of the over-speed type (direct on third) is shown in Fig. 1.

Unit at Rear of Transmission

In this design the internal and external gear unit (Fig. 2) is located at the rear of the transmission. In front of this over-speed unit is located the conventional three-speed-and-reverse gears and shafts. One of the advantages of this type of transmission from a manufacturing standpoint is that it is necessary to redesign only the case, cover and part of the shifting mechanism, thus retaining many of the transmission parts used in current production. A number of transmissions of this type which have been in use for from 20,000 to 42,000 miles have not shown any appreciable wear in this mileage and have not lost their quietness.

In the average car the over-speed or fourth speed is used only (after the novelty wears off) at over 30 m.p.h. At these speeds no gear noise can be detected. Up to 30 m.p.h. there is a slight gear noise, which is most pronounced at about 20 m.p.h.—a noise that is scarcely objectionable though it can be detected. With the average car, however, the ratio of 3½ to 1 is too small for proper car performance at less than 30 m.p.h. except on deceleration. When in fourth speed it is not necessary to shift to third when slowing down even to a stop. It has been our experience that the over-speed makes less noise in deceleration than the under-speed, though it possibly makes a little more noise on acceleration; but inasmuch as the over-speed is not used until the car reaches a speed of 30 m.p.h. this is not noticeable.

Referring again to Fig. 1, it will be noticed that the rear end of the splined shaft *A* is flanged. Riveted to this splined shaft is the internal gear *B*, inside of which is an internal splined clutch. Meshing with the internal gear *B* is the external gear *C*, which in turn is keyed to the hub of the internal gear *D*. Gears *C* and *D*, which are keyed together, may be termed the spool gear. This spool gear is mounted in a roller bearing carried in the case eccentric to the main shaft bearing by half of the difference between the pitch diameters of the internal and external gears. External gear *E* meshes with internal gear *D* when in the over-speed. Gear *E* can

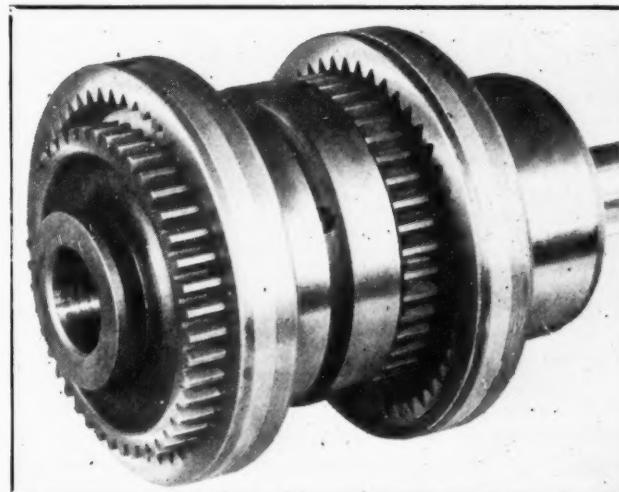


Fig. 2. Thompson internal and external gear unit

either be made integral with or splined to sleeve *F*, which is a sliding fit on shaft *G*.

Fig. 1 shows all gears in the fourth-speed position. For any other speed, the internal gear *E* is shifted out of mesh, and clutch *H*, which is a portion of sleeve *F*, is moved back into mesh with the internal clutch *I*. The positions of the shifting lever for the different speeds of this design of transmission are shown in Fig. 1-A. The ratios in this design of transmission are varied somewhat, depending on the weight of the car and the size of the engine, but the average is as follows:

Fourth Speed 1 to 1.30 Second Speed 1.75 to 1
Third Speed 1 to 1 First Speed 3 to 1
Reverse Speed 4 to 1

Fig. 3 shows the more compact type of four-speed transmission in which fourth speed is direct and third speed is through the internal and external gear unit. Unlike the transmission in Fig. 1, this design embodies no standard three-speed transmission parts. In this design the main shaft *A* takes the place of the conventional stub shaft and splined shaft, and extends from the main clutch back almost to the rear end of the transmission, the small constant mesh gear *B* being splined to shaft *A*. The rotative countershaft in this design is a splined shaft and carried on bearings mounted on the stationary shaft. Constant mesh gear *C* and reverse gear *D* are a press fit on the shaft *E*. First and second speed gears *F* are a sliding fit on shaft *E*.

The internal and external gear unit is identical in principle with the design in Fig. 1, but reversed in the position of the gears. The unit in Fig. 1 is a speed-increasing unit, used for fourth speed, but in Fig. 3 it is a speed-reducing unit that is used for third speed.

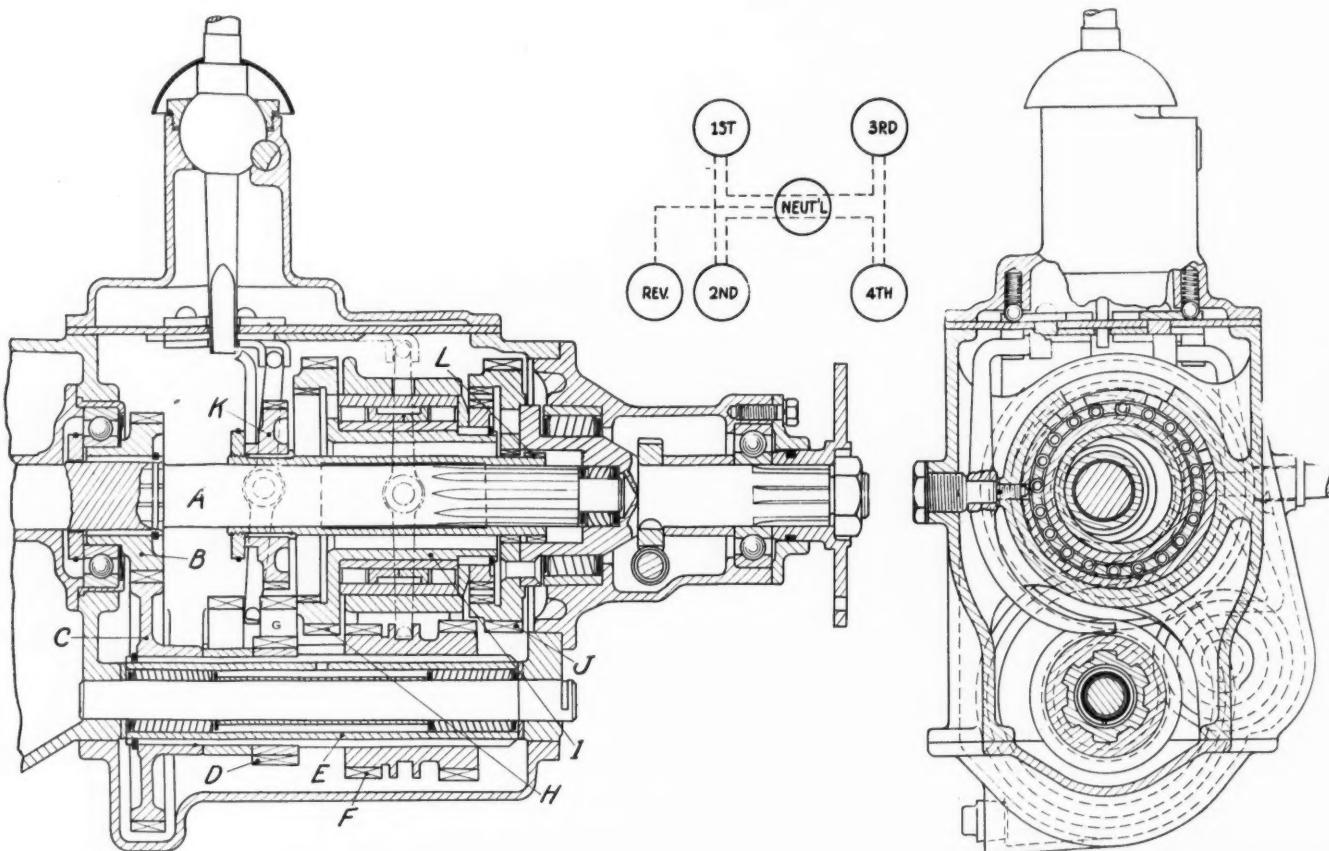
Fig. 3 shows all gears in the neutral position. It will be noticed that in this design the internal gears

carry spur teeth on their outside, which are used for first, second and reverse speeds. The stub shaft in this design is at the rear of the transmission. It will also be noticed that the spool gear is eccentric to the main shaft horizontally, instead of vertically, as shown in Fig. 1. Also, on account of the first and reverse speeds being transmitted through the spool gears, the bearings are spread farther apart.

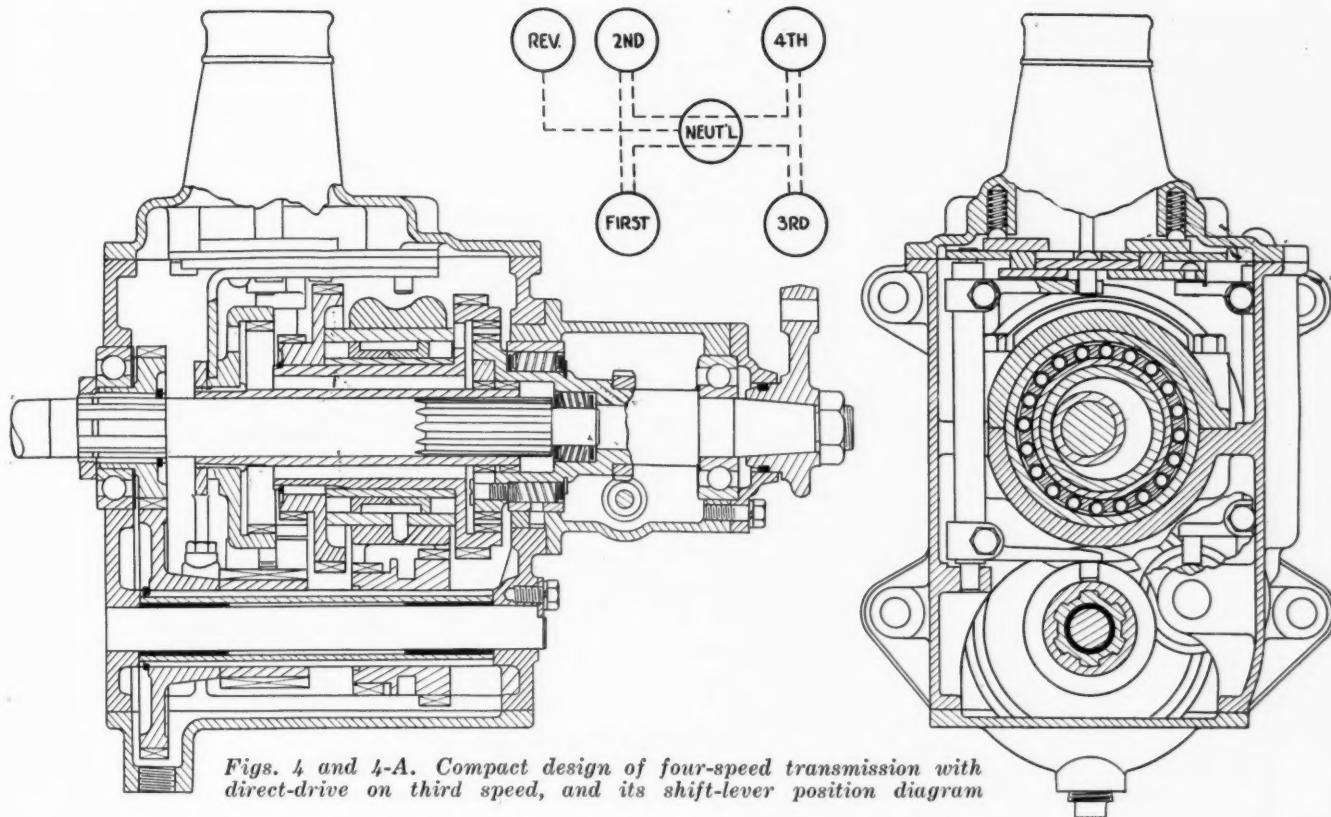
The different speeds in this design are obtained as follows: To obtain reverse, gear *G* is shifted into mesh with gear *H* and *F*, which drives the spool gear *I*, which in turn drives gear *J*, which is riveted to the rear stub shaft. First speed is obtained by shifting gear *F* forward into mesh with gear *H*, which is a part of spool gear *I*, which in turn drives gear *J*. Second speed is obtained by shifting gear *K* to the rear, meshing it with internal gear of spool gear *I*. The driving shaft *A* drives the sleeve (which is a part of gear *K*) by means of a splined connection on the main shaft. Gear *K* drives the internal gear of spool *I*, and the external gear on spool *I* drives the internal gear *J*. Fourth speed, which in this design is direct, is obtained by sliding gear *K* forward, connecting the splined clutch *L* to the clutch which is a part of gear *J*. The position of the shift lever in this design is shown in Fig. 3-A. The ratios of the different speeds in this design average about as follows:

Fourth speed 1 to 1 Second speed 2.25 to 1
Third speed 1.40 to 1 First speed 3.50 to 1
Reverse 4.25 to 1

Fig. 4 shows a design of the compact type of four-speed transmission in which third speed is direct and fourth-speed an over-speed. It is very similar to that shown in Fig. 3, except that the internal and external gear unit in this design is a speed-increasing unit, the



Figs. 3 and 3-A. Four-speed transmission with direct-drive on fourth, and the corresponding shift-lever position diagram



Figs. 4 and 4-A. Compact design of four-speed transmission with direct-drive on third speed, and its shift-lever position diagram

same as in Fig. 1. Reverse, first and second speeds are all taken through the rear set of internal and external gears. In this design the bearings on the spool gear are also farther apart than in Fig. 1, on account of the extra load carried when transmitting reverse, first and second speeds through the spool gears. The position of the shifting lever with this design of transmission is shown in Fig. 4-A.

Elaborate efficiency tests made by the Morse Chain Co. on different sizes of gears of different pitches and pressure angles have shown that the loss in gears of the proper size to give the most quiet result is from $1\frac{1}{2}$ to 2 per cent. This loss includes the friction in the bearings of the spool gear, which is a part of the unit. It was also found that the size of the gears has an important bearing on the quietness. It will be noted that the internal

and external gears in this unit are quite large, compared with the other gears in the transmission, the sizes of these gears having been determined entirely by tests with a view to obtaining the most quiet results from the transmission.

It will also be noted that in all designs both sets of internal and external gears are the same size. The outer race of the spool gear bearing is made eccentric, to allow for adjustment of the centers and back-lash of the gears, which on this type of gear is of great importance. Tests on at least 25 sets of these gears proved that the most quiet operation is obtained with a back-lash of between 0.004 and 0.005 in.. Elimination of bearing noise on the spool gear was quite a problem and was accomplished by providing an extremely smooth finish on the rollers, inner and outer races.

Motor Vehicles to Play Important Role in Africa's Future

THE economic development of the African continent is dependent largely on one factor—adequate transportation. According to a trade bulletin issued by the Department of Commerce, the motor vehicle seems destined to play an important role in Africa's future. In many sections it has already succeeded in replacing the camel and the ox and has thereby changed the meaning of distance. Automobiles and trucks, the report discloses, are doing yeoman service in the torrid regions of the Equator, on the South African veldt and in the Egyptian Sudan.

Because of the lack of good roads the only cars which can hope to prove successful in most sections of Africa are those of the sturdiest construction—able to cope with the greatest obstacles. The American car having been developed to meet the most severe tests is admirably adapted for use in Africa, it is pointed out.

What the modern motor vehicle is capable of doing

for South Africa is indicated in the use made of motor buses in Capetown to supplement the electric train service. In Konya Colony, where the population is so scattered that the building of railroads to reach interior points is out of the question, bus and truck services have been installed so that the whole population can readily transport themselves and their products to the commercial centers at the seaport. The demand for trucks, the report discloses, has been greatly stimulated in the last three years on the Gold Coast to replace the former unsatisfactory and inadequate modes of transportation which are fast disappearing.

No section of the world, the report states, is richer in resources or progressing more rapidly at the present time than Africa and it seems highly desirable that all facilities be utilized to acquaint this market with the peculiarly adapted features of American motor cars and trucks.

College to Study Action of Fuel Spray in Heavy Oil Engines

Apparatus designed at Penn State is described in paper read at recent oil fuel meeting. Investigation planned to clear up questions that trouble engine builders.

THE widening application of Diesel engines and the need of further development of the solid or air-less injection system have led to the development of several devices for recording the pressures active in the fuel lines in injectors of solid injection engines and for studying the character of the oil spray, at Pennsylvania State College. These were described in a paper by Prof. P. H. Schweitzer read at the recent oil fuel meeting held at State College under the auspices of the American Society of Mechanical Engineers. Following are some extracts of Prof. Schweitzer's paper:

The action of the fuel spray before ignition is considered as having a most vital effect on the performance of an oil engine, and it is regrettable that so little is really known about it. How far does an oil jet penetrate in compressed air? What is the shape of the fuel spray? What is the state and size of the globules? How do they change? These are questions we can't even vaguely answer today, though this information is very important to the engine builder.

With our investigation we plan to clear up some of these questions and furnish the designers with facts and data that will enable them to construct more efficient and higher speed engines.

Until recently all oil spray investigations were made with actual engines. It has been recognized, however, that such investigations can hardly yield specific results, because of the difficulties of separating the variables. Properly conducted laboratory experiments are necessary to secure reliable and generally applicable results.

Our experimental equipment is similar to that of the National Advisory Committee for Aeronautics at Langley Field and that of Dr. Riehm at Augsburg, and consists of a chamber for compressed air or inert gas, devices for the production of fuel sprays and means for observation and measurement. The apparatus is designed only for the investigation of the oil sprays prior to ignition.

The pressure chamber (Fig. 1) is a rectangular

casting with 28 by 20 by 20 in. outside dimensions and 2 to 2½ in. wall thickness, tested for 800 lb. hydrostatic pressure. It has two plate glass windows, 1 in. thick. One is for observation and one for illumination. The observation window is provided with a window wiper for cleaning off the oil. Illumination is furnished by a 400-watt lamp.

In the study of the penetration energy, visual observation is supplemented by a pendulum device (on top of the chamber) which is deflected by the spray. The deflection of the pendulum is shown by a light-beam reflected by a small mirror attached to the pendulum, and after a second reflection by the long 45 deg. mirror, is projected to the screen visible at the right-hand side of the chamber.

The compressed air line connects the pressure chamber with the air bottles in the background, which are filled with a four-stage air compressor located in the next room.

At the left end of the pressure chamber the injection nozzles are mounted in adjustable nozzle holders. By using spacers the distance from the nozzle tip to the pendulum can be varied. Injection by both automatic and cam-actuated nozzles is studied. Our standard experimental nozzle is cam-actuated and the oil pressure is maintained uniform during the injection. For this purpose an accumulator is placed in the line which prevents a rapid variation of the liquid pressure. The pressure is produced by a hand pump capable of giving 10,000 lb. per. sq. in.

In order to produce rapid single injections, a control mechanism operates the lever which acts on the needle valve of the nozzle. It can be seen at the left hand side of the chamber (Fig. 1). The fuel cam while revolving moves axially and disengages from the roller after one revolution is completed if so desired. In this way not only continuous but intermittent sprays can be studied by one or any number of injections.

When testing automatic injection nozzles, a cam-driven power pump

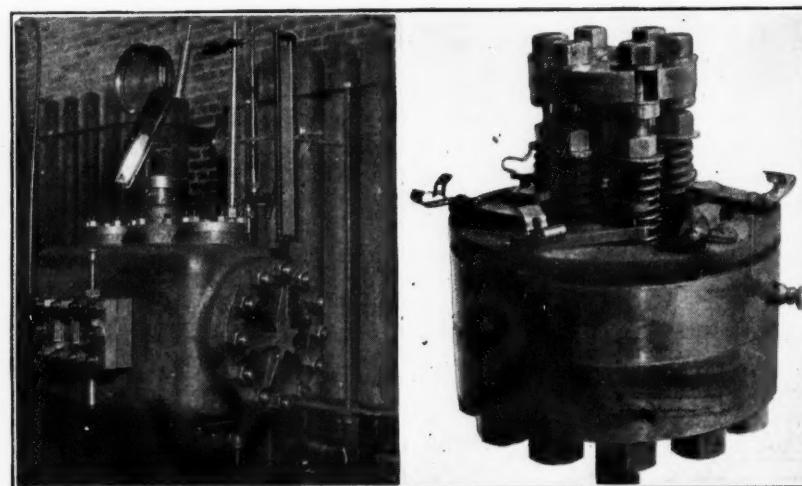


Fig. 1. Pressure chamber for studying oil sprays

Fig. 3. Pressure diaphragm and electric contact chamber

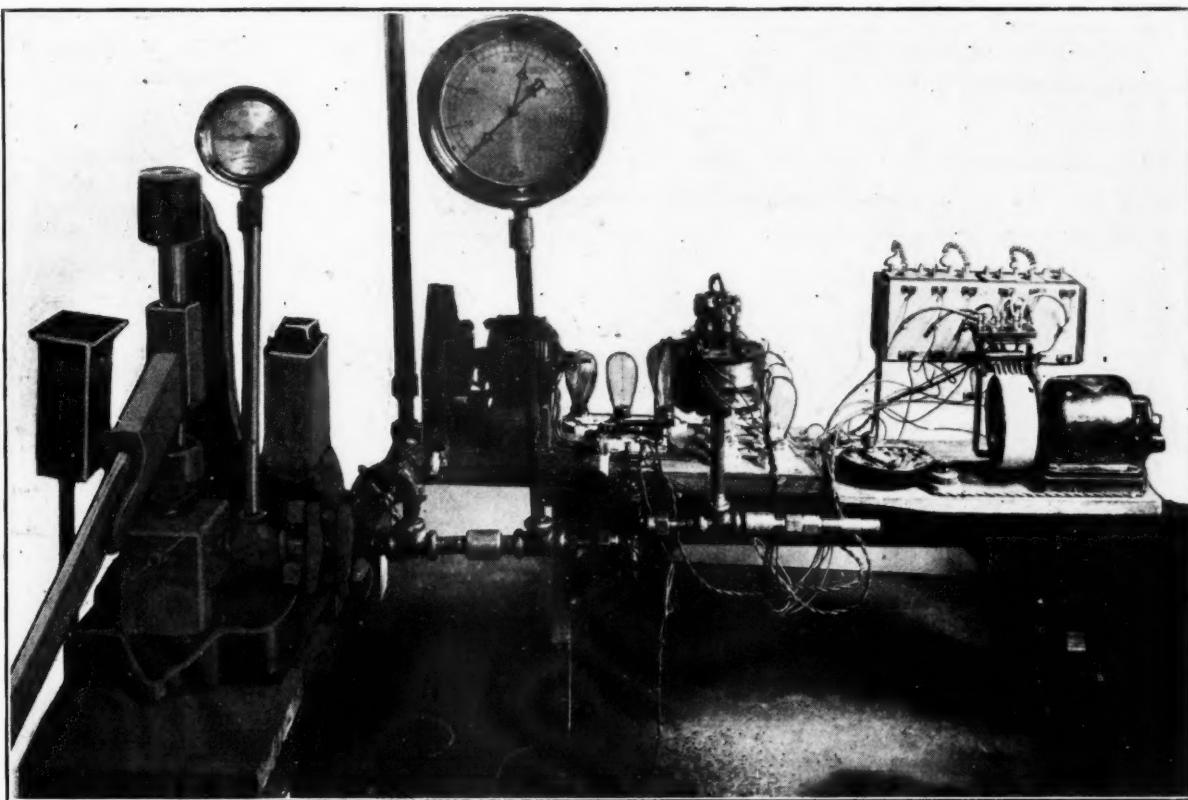


Fig. 2. Set-up for recording pressure variations in oil lines to injector nozzles

will be used instead of the hand pump.

Another accessory which is planned but not yet built is the spray stroboscope. It will be between the nozzle tip and the pressure chamber and driven by the same shaft as the fuel cam. It is a disk with narrow slots which permit the passage of the spray only at definite intervals. The rest of the spray will be kept from entering the chamber. By corresponding angular adjustment of the disk, various phases of the injection, such as the beginning, the middle part or the end can be separately studied and the energies determined.

To record the pressure variations in the injection line during the short time of the injection, a special indicator is used.

In preparing for this investigation we were confronted with the problem of recording pressure variations which take place in as short a time as 0.01 second or less, during which time the pressure rises to several thousand pounds per sq. in. and drops back almost to zero. Since no instrument seemed to answer these requirements, we developed and built in our shops the indicator which is shown assembled in Fig. 2. Fig. 3 shows the main parts in detail.

Number of Registering Elements

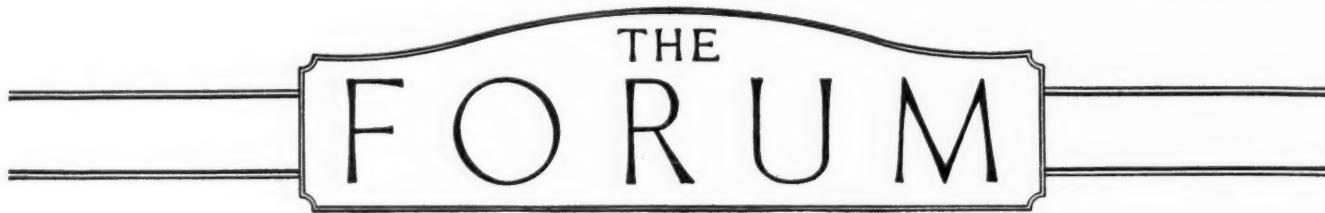
The main principle of the indicator is the use of a number of pressure registering elements instead of a single one. Each of the six diaphragms is set for a different pressure, and at the instant the pressure reaches a predetermined pressure, electric contact is made, which is recorded on a rotating drum. The contact is maintained as long as the pressure exceeds that for which the diaphragm is set, and during that time the corresponding spark needle on the drum punctures the paper at each spark, producing a row of holes. In this way a number of lines are produced, the length of each corresponding to the time interval during which the pressure exceeds the pressure for which the respective diaphragm is set. Using six diaphragms, which

deflect at, say, 200, 400, 750, 1200, 2000 and 3000 lb. per sq. in. pressure respectively, we obtain 12 points, six for the ascending and six for the descending curve, indicating the time at which these pressures were passed during the injection. The connection of these 12 points into a continuous curve, giving a time-pressure diagram, offers no difficulty. The electrical recording is practically instantaneous and since the movement of the diaphragms is but a few thousandths of an inch, the inertia effect is negligible.

With this indicator, pressure variations of several thousand pounds within less than one hundredths of a second have been recorded, and time-pressure diagrams obtained.

THE American Society for Steel Treating, 4600 Prospect Ave., Cleveland, Ohio, has issued to members a tentative recommended practice for the heat treatment of plain carbon and alloy steel die blocks. It contains tables of the approximate composition of plain carbon steel die blocks, the approximate composition of alloy steel die blocks, heat treatments for carbon steel die blocks, hot and cold forming die blocks, heat treatments for alloy steel die blocks, approximate chemical composition for cold heading dies, heat treatments for cold heading dies, approximate composition of die blocks for silverware and heat treatments for die blocks for silverware. The recommended practice is tentative and will remain so until it is adopted by the recommended practice committee and the board of directors.

AN airplane service to cut down delays due to breakdowns or other causes on its bus lines is being established by Pickwick Stages in the Northwest. Headquarters will be at Roseburg, Ore., and the plane will be used to carry mechanics and parts to buses in an emergency.



THE FORUM

Stock Car Racing Seen as Means of Checking Up on Speed Claims

Place to make speed and endurance claims is on speedway, not in public prints, says president of Stutz

Editor, AUTOMOTIVE INDUSTRIES:

Your interesting page, "Just Among Ourselves," on May 7 carried an article headed, "What Price Stock Car Racing?"

In a broad way I have no criticism of your conclusions, provided you assume the stand that, regardless of what claims a manufacturer may make in public print, he has no responsibility to prove those claims, for in the last analysis, all a stock car race is for is to demonstrate certain very definite claims of either speed or endurance.

The past year has shown us many loose claims of superiority in speed. Some of our most conservative companies have made claims they were not prepared to prove. Stock car racing and speedway tests properly supervised will rectify all this.

The place to make speed and endurance claims is on the speedway, not in public prints. The manufacturer who makes these claims and then will not risk the very claims he makes in public tests does not deserve much from a fair-minded American public.

There is much to be learned from stock car racing. Any car that will average 65 m.p.h. for 24 hours on the Indianapolis Speedway will give the owner a performance infinitely superior to that of cars who can't do it. I merely use that figure as a yardstick.

Your statement that only one winner gains anything I predict will be thoroughly disproved in the next month. Watch the advertisements in relation to the Atlantic City Speedway. Whereas the race was won by a Stutz at 86.24 m.p.h., I predict the car finishing second will spend considerable money to advertise that fact, and I'd be surprised if the car finishing third also did not advertise that feat. And why not? They were splendid performances, indeed.

Stock Sedan Averaged 80

Our own stock sedan finished well back, yet, including a stop for a tire change, it averaged over 80 m.p.h. Isn't that good cause for advertising?

So you see quite a lot of good can come to those that did not win.

As to what is a stock car, that question will never be answered by sitting around and talking about it. It will only be definitely fixed when a few firms, who venture to race, find out the difficulties, give and take exper-

iences, and finally agree on a set of rules. It can be done and will be. Our own car was exactly as delivered to customers in every respect.

No one that witnessed the first stock car race at Atlantic City Speedway can possibly question the public's interest in this form of sport—and why not? So with public indorsement, and the proper technical supervision—the A.A.A. control—we can easily work out the definition of "What is a stock car?"

I hold no brief against those concerns who carry their reputations carefully wrapped in camphor balls, but I do say if their reputations are so brittle that they cannot stand the light of open competitive publicity, then let them moderate their claims of performance, stamina and speed. For after all is said and done, it is simply a matter of "Shall truth in advertising prevail?"

In conclusion, may I ask, how would you suggest a manufacturer protect himself against these unfounded, unproved, promiscuous claims?

F. E. MOSKOVICS, President,
Stutz Motor Car Co. of America, Inc.

Expressing Overhead Costs

Editor, AUTOMOTIVE INDUSTRIES:

I have just read with interest the article on "Future Economies in Production Will Come From Overhead," by W. L. Carver, contained in your issue of April 2.

The automotive industry has become so accustomed to one conventional method of expressing overhead costs that it may be a good thing occasionally to discuss the subject in *Automotive Industries*. In instances where direct labor cost represents a high proportion of manufacturing cost or, more specifically, a high ratio to manufacturing expense, the scheme of expressing overhead as a ratio to direct labor has certain advantages, but there are attendant disadvantages. Many executives adopt the point of view that the ratio must be kept down, regardless of any other consideration. This is, of course, a ridiculous viewpoint, because the executive should be interested in overhead ratio simply as an indicator. Primarily, his interest centers on total cost and, quite obviously, the lowest cost may be brought about by deliberately increasing the ratio of expense to direct

labor. In fact, a very large part of our manufacturing economies are brought about exactly by this process.

Now, as this ratio of expense to direct labor increases, the method of expressing overhead becomes unwieldy and the question arises as to whether a better method cannot be adopted. We approach the condition which obtains in manufacturing operations which are performed almost entirely by the use of automatic machinery. In such operations it becomes entirely impractical to express manufacturing overhead in terms of a ratio

to direct labor.

As Carver suggested, it may be quite reasonable to consider transferring certain costs which are now thrown into the overhead columns as direct costs. It may be well for the automotive industry to begin looking outside of that industry for better methods of presenting its cost analysis to its executives.

LOUIS RUTHENBURG, General Manager,
Yellow Sleeve-Valve Engine Works, Inc.

Oakland Develops Machine for Diamond Boring of Piston Pin Bushings

A MACHINE for diamond boring of piston pin bushings has been developed and is being used by the Oakland Motor Car Co., consisting of a standard 9 x 12 Sundstrand lathe with belt-driven head and a specially built fixture; two of these machines can be operated by one man, with a total production of 100 connecting rods per hour.

A feature of the machine is that the head is used for driving only, the fixture holding the rod being fed away from the head. The diamond itself is mounted on a shaft which rides in steel bushings in the fixture, the end of the shaft being slotted to fit in a chuck mounted on the head. The limit of accuracy obtained with this apparatus is 0.0002 in.

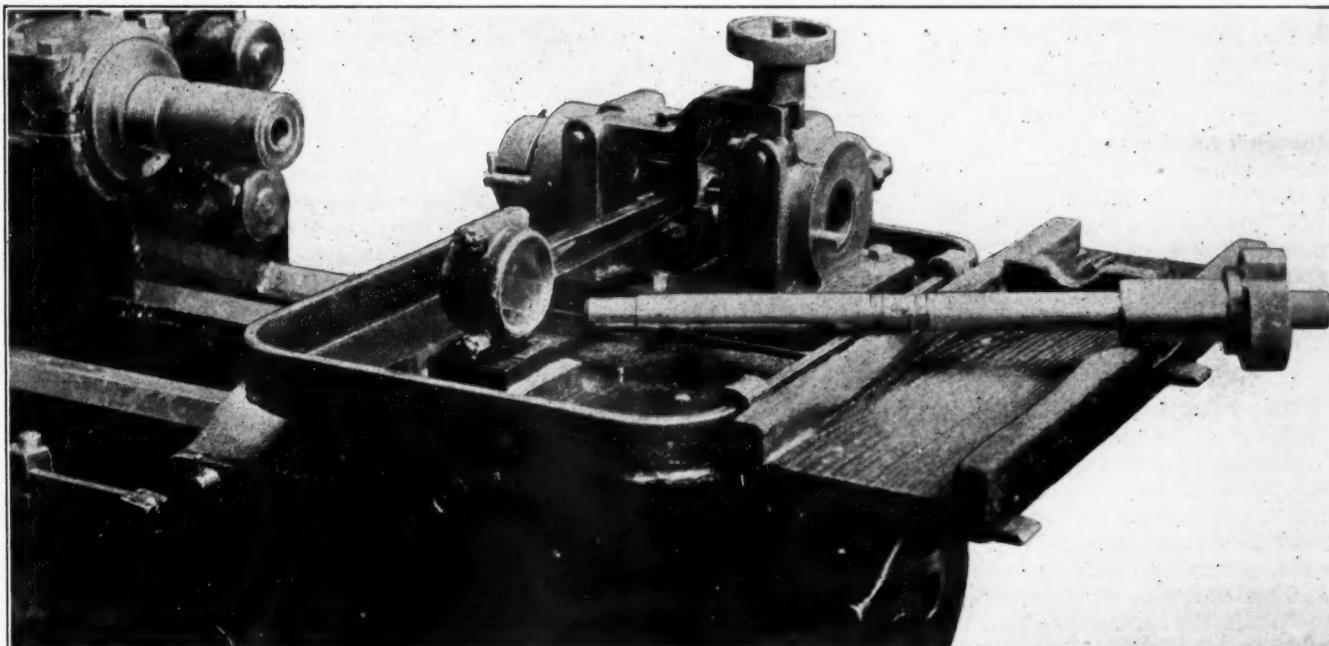
Head Driven at 3600 R.P.M.

A motor running at 1800 r.p.m. is used to drive the head at 3600 r.p.m., a belt drive being used to lessen vibration. The specially built fixture consists of a rest which supports the projecting ends of the piston pin bushing, the lower end of the rod resting on a flat plate. The rod is held down by a quick-acting clamp, acting on the web flange of the rod immediately below the piston pin bushing. On either side of the rod a steel bushing

is mounted on the fixture to support the shaft containing the diamond. These bushings are subjected to very little wear, since the shaft rides on a film of oil in the bushings, fed under pressure by a gear pump driven from the lathe head. Clearance in these bushings is 0.0003 in. Lubrication of the bushing during cutting is obtained by having a branch oil line throw a jet of oil through an oil hole in the pin end of the rod.

An automatic stop is provided on the lathe, controlling the feed of the fixture. An adjustment for the position of the diamond in the chuck is also provided. In production, the fixture is moved toward the head by a hand-wheel. The rod is placed in the fixture, the bar on which the diamond is mounted is passed through the bushings in the fixture and locked in the chuck by simply giving it a short twist, and the rod is then locked down with the clamp. Starting the head also starts the feed, the bar rotating with the head, and the rod and fixture moving away from the head at slightly less than 0.001 in. per revolution.

The Oakland Motor Car Co. is also experimenting with a similar machine which will diamond-bore both ends of the rod simultaneously. This latter machine will have one fixed and one adjustable head.



An Oakland connecting rod ready for diamond boring of the 2in end

Use of Fewer Gear Materials Urged to Cut Manufacturing Cost

Suggestion of President E. J. Frost at meeting of American Gear Manufacturers Association is referred to committee. Shop equipment situation is pictured as serious problem.

By A. F. Denham

EVER since the clash type transmission and gearshift lever came into use on automobiles, inventions and designs have been produced in an endeavor to eliminate the cumbersomeness of the shift as we know it. Not a single one of these devices has had any appreciable length of life, however, although over 200 have been offered to the industry.

That this is not due to lack of interest of the industry in such developments was pointed out by Perry L. Tenney of the Muncie Products Co., in a paper presented before the eleventh annual convention of the American Gear Manufacturers Association. While quite a number of these devices have been excellent from a purely mechanical point of view, there have been several reasons why they have not become commercially practical. While high production cost was a factor in eliminating some of the devices, others possessed the objectionable feature that the method of operation was such as to be contrary to the natural instinct or "equilibrium" of the driver. According to Mr. Tenney, any device intended to eliminate gearshifting should receive just as much study from an anatomical as from a mechanical point of view.

A number of interesting papers were presented at the meeting, which was held at the Hayes Hotel in Jackson, Mich., May 12 to 14. Included among these were the following: "Gearing Nomenclature—Where Does This Lead Us?" by Douglas T. Hamilton of the Fellows Gear Shaper Co.; "Normal Pitch Measurements," by B. Wheeler of the Railway Equipment Engineering Department of the Westinghouse Electric and Mfg. Co., and "Team Work for Improving Products and Methods," by Z. R. Dickinson, associate professor of economics, University of Michigan. Reports of the various standardization committees showed that an unusual amount of work had been accomplished during the past half year.

President's Address

Over a hundred members registered for the meeting. In his opening address, President E. J. Frost summarized conditions as they exist today in the technical development of gear manufacture, stating that there is now an insistence on better steels and other materials used in gears, and new alloys are being continually developed to meet this demand. Greater tensile strength and resistance to wear are sought.

"While the automotive field has been largely responsible for this state of things" said Mr. Frost, "other branches of industry are profiting thereby. Electrically heated furnaces and sensitive pyrometers are finding

ever wider use in the gear manufacturing field. Shop equipment, however, is becoming a serious problem. This equipment has undergone such changes that items of inventories which a short time ago were regarded as valuable assets, are now of problematical worth, although far from worn out. Changes in the type of product may call for an entirely new set of machines, relegating otherwise useful equipment to subordinate use or perhaps even to the scrapheap."

Mr. Frost recommended that, for the sake of economy in manufacturing, one material be selected for use for any one purpose, instead of using six or eight different materials, as at present. His suggestion was referred to the Metallurgical Committee. While this plan would probably meet with considerable opposition on the part of steel makers, it would cut down stocks of steel which have to be carried, not only by gear manufacturers but also by forge companies.

Standardization Committee Report

A summary of the work of the various committees during the past year and the recommendations offered by these, was included in the report of the General Standardization Committee presented by B. F. Waterman, chairman. The Bevel Gear Committee presented a progress report, as did the Differential Committee and Transmission Committee. Two recommendations of this latter committee, one on transmission nomenclature and one on automotive engine flywheel housings, were adopted at the October, 1926, meeting.

A proposed recommended practice for high-speed herringbone gears operating at over 4000 ft. p. m. pitch line velocity was offered by the Herringbone Gear Committee, and adopted. The report of this committee was presented by A. A. Ross of the General Electric Co., in the absence of A. F. Cooke, chairman. With the highly specialized nature of this type of product it has been rather difficult to set any standards. As a result, no attempt has been made to standardize such factors as pressure angle and helix angle. However, a maximum pressure angle of 20 deg. in the plane of rotation and a minimum pressure angle of 14½ deg. normal to the tooth axis were recommended, as were minimum and maximum values of 20 and 45 deg. respectively for helix angles.

Accompanying the report of the committee was a paper on "Tooth Pressures for High Speed Gears," presented by Mr. Ross, explaining how the various standards set were arrived at. It was based largely on the experience of the General Electric Co.

The Inspection Committee offered a progress report. A proposed recommended practice for standard key-

ways was presented by R. B. Zerfey, chairman of the Keyway Committee, and was adopted. Square keyways are to be used for bores up to $4\frac{1}{2}$ in. diameter; rectangular keyways, from $4\frac{9}{16}$ in. A list of "special" rectangular keys for bores of from $\frac{1}{2}$ to $4\frac{1}{4}$ in. was also included, for use when conditions make it necessary to deviate from the standard square keyway in these sizes. For keyways up to and including 1 in. in width, a plus tolerance of 0.001-0.002 in. is allowed, and for keyways of greater width, a plus tolerance of 0.002-0.003 in. above nominal size. The reason for this is that manufacturers of keystone allow a plus tolerance on keystone to take care of the large or oversize keyway which a standard milling cutter cuts in shafting. The dimensions of keystone vary within limits of minus zero plus 0.0015 for sizes up to 1 in. width, and of minus zero to plus 0.0025 for larger sizes. The following limits are specified for the depths of keyways: Straight keyways, minus zero, plus $\frac{1}{64}$ in.; taper keyways, minus $\frac{1}{64}$ in., plus zero; keyways in heat-treated pinions, $\frac{1}{32}$ in. clearance over key (minus 0, plus $\frac{1}{64}$ in.), with a $\frac{1}{32}$ in. radius at the corners.

A new proposed recommended practice for "Forged and Rolled Carbon Steel for Gears" was offered by the Metallurgical Committee, C. B. Hamilton, chairman. It was adopted and will become standard if approved by the A.E.S.C. Sectional Committee. Three classes of gears are considered—case-hardened, untreated and hardened. The steel for case-hardened gears corresponds to S.A.E. No. 1020 steel, the only difference being that the lower manganese limit is higher, 0.40 instead of 0.30 per cent., the upper limit of 0.60 per cent being retained. The untreated gear steels are identical with S.A.E. Nos. 1030, 1035, 1040 and 1045. The hardened steel gear material recommended is identical with the previous S.A.E. 1046, except for a modification of the manganese range, to from 0.40 to 0.60 per cent, this steel having been dropped by the S.A.E. The S.A.E. No. 1015 steel has been dropped from the A.G.M.A. standards. Included in the report are recommendations for marking, inspection and rejection.

A revised recommended practice for bronze and brass castings for gears was also offered by the Metallurgical Committee, this being practically unchanged and merely rearranged to follow S.A.E. and A.S.T.M. practice, including a practice for sampling and rejection. This was also adopted. It is expected by the Metallurgical Committee that a recommended practice for alloy steel gear materials will be ready in about six months.

A change in the formula for computing safe working stress of non-metallic gears was suggested by the Non-Metallic Gearing Committee, T. C. Roantree, chairman, and adopted. This change has been found necessary following tests on the Lewis gear testing machine at Massachusetts Institute of Technology. The original formula was based on the change in strength with pitch line velocity of cast iron gears, and the tests on the non-metallic materials showed that on account of the far greater elasticity of these materials the "cast iron" formula is not strictly applicable. The old formula for the safe working stress was

$$\frac{600}{600 + \text{pitch line velocity}} \times 6000 \text{ lb. p. sq. in.}$$

This has been changed to

$$\left(\frac{150}{200 + \text{pitch line velocity}} + 0.25 \right) \times 6000 \text{ lb. p. sq. in.}$$

the net result being to increase the safe working stresses for pinions operating at over 1000 ft. p.m. pitch line

velocity, and to decrease the stresses below this speed.

In presenting the report of the Nomenclature Committee, which included a "suggested standard for future design" for external spur gear nomenclature, Mr. Hamilton, chairman, presented his paper on "Gearing Nomenclature—Where Does It Lead Us?" In this he summarized the difficulties that are encountered in attempting to adopt a system of nomenclature for gearing which would satisfy everyone. Even such terms as "spiral" and "helical" are being used interchangeably in dictionaries.

Multiple Letter Nomenclature

The system of nomenclature suggested by the committee is of the multiple letter type, and is open to criticism by mathematicians on the ground that two letters placed close together are generally taken to imply multiplication. In view of the fact that no better system has been suggested, however, by objectors, the multiple letter system of symbols has been incorporated. The practice was tentatively adopted by the A.G.M.A., with the suggestion that several changes be made, the most important of which is the altering of symbols, definitions and sketches so as to cover all types of gearing, rather than the involute system alone, as proposed in the report. Forty-eight symbols were included in the suggested standard.

A progress report was offered by the Sprocket Committee. A recommended practice for commercial spur gearing backlash measured on standard center distance with a feeler was proposed by the Spur Gear Committee, J. L. Williamson, chairman, and was adopted with a suggestion that a paragraph be inserted qualifying the word "commercial" so as to exclude all gears subjected to special conditions, such as heavy loads, high temperatures, etc. The backlash recommended is given for diametral pitches ranging from 24 to 1, values for minimum, average and maximum backlash being given. The recommended backlash follows present commercial practice closely, ranging from an average of 0.003 in. for 24 D.P. to 0.008 in. for 5 and 0.040 in. for 1 D.P. For any particular pitch the minimum, average and maximum backlashes are found by dividing 0.03, 0.04 and 0.05 by the diametral pitch.

Separate Report Submitted

In connection with the report of the Spur Gear Committee, a separate report prepared by L. F. Burnham, of this committee, was presented in his absence by Perry L. Tenney. The report dealt with the work of the committee during the past year on the tables for horsepower transmitted by standard pinions. Illustrative rules have been added, as well as more numbers of pinion teeth, while the completed number of bores was decided on. The tables were also filled in to some extent. These tables give the allowable horsepower for standard $14\frac{1}{2}$ deg. involute untreated forged steel pinions, for bores ranging from 0.50 to 5.00 in. in steps of 0.25 in. up to 2.00 in. and steps of 0.5 in. from there on. For each bore, separate tabulations are made for shaft stresses of 4000, 6000 and 8000 lb. per sq. in. At present the number of teeth given ranges only from 15 to 18. It was recommended, in adopting this report, that the number of teeth be carried further, to 30 or 40. The committee was instructed to thus enlarge the tables, and it was also suggested that gears carrying loads in accordance with the tables be subjected to actual tests.

For materials other than untreated forged steel it is intended to use a "material" factor in determining the permissible horsepower, so that only a single set of charts will be needed. This factor will be based on the allowable stress in the particular material. The committee

expressed the hope that the completed charts would be available at the Fall meeting.

A recommended practice for 14½ and 20 deg. full-depth tooth systems was submitted by the Tooth Form Committee, H. J. Eberhardt, chairman, and was adopted with a suggestion that a clause be inserted in the recommended practice limiting the number of teeth in gears mating with the pinions, proportions for which are given, to assure full involute action. In presenting this report, the committee expressed the hope that in future some of the tooth systems may be eliminated, reducing the total from four to one or possibly two. Tables of diameter modifications to avoid undercut are included for both systems, and range from 31 teeth down for the 14½ deg. system and from 17 teeth down for the 20 deg. system. This increase of diameter of the pinion, of course, has to be taken care of by decreasing the diameter of the mating gear correspondingly so as to maintain standard center distances. Both systems recommended are based on the A.E.S.C. Tentative American Standard Spur Gear Tooth Form, 14½ deg. Composite and 20 deg. Stub Involute system approved in January by the A.S.M.E. and A.G.M.A. as sponsors.

Worm Gear Committee

The Worm Gear Committee offered a revision of an earlier recommended practice for the use of present existing hobs, and for the design of industrial worm gearing when new hobs are to be made. The changes related chiefly to details and to a rearrangement of the earlier practice. The large and expensive assortment of hobs now in existence makes it difficult to effect an immediate transition to recommended standards, and for this reason the practice is designed to make the best use of existing hobs.

The report of the A.G.M.A. Research Committee, E. W. Miller, chairman, was of the progress type. Tests on the Lewis machine at M. I. T. have shown that at low speeds and small loads the elasticity of the material has a detrimental influence. Tests have also shown that friction losses are lower with fine pitch gears, evidently increasing with the diametral pitch.

In his paper on the "Equilibrium Factor in Gearshift," Mr. Tenney analyzed anatomical reactions of the individual, such as the desire to "grab everything" in case of an emergency. He pointed out that the joystick type of control as used in airplanes was ideal from this point of view, since any motion of the stick produces a corresponding motion of the airplane. In motor car gearshift design, this should also be in conformity with the driver's sense of equilibrium. From this point of view, pre-selective shifting is confusing and misleading. Boiled down, a gearshift should be so designed that the shift is accomplished correctly by natural instinct.

Cost is Too High

While some of the devices on the market at present eliminating the motor car gearshift, notably the gas-electric drive are ideal from the "equilibrium" angle, their installation on average passenger cars is prevented (first) by the expense factor and (second) by the fact that such an installation often is accomplished by sacrificing other qualities which the public has come to accept as desirable.

"Normal Pitch Measurements," the paper presented by Mr. Wheeler of the Westinghouse company, dealt largely with measurements on railway gears. In the opinion of the Westinghouse company, and of the R. D. Nuttall Co. which is associated with the Westinghouse company, correct tooth spacing is a far more important factor than tooth form, from the standpoint of silent

operation. Working from this angle they have developed gages for checking normal pitch distances on railway gears, normal pitch being the distance between corresponding involute tooth contours on adjacent teeth, measured along a line tangent to the base circle and therefore "normal" or perpendicular to the contours.

Trip to Ann Arbor

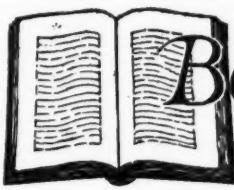
No provision was made during the meeting for a special meeting of the automotive group. A trip was made, however, to the University of Michigan at Ann Arbor, where the apparatus for measuring and analyzing gear noises was inspected and explained by Professor White of the Engineering Department. This system has been worked out by the Engineering Department of the U. of M. in collaboration with the Timken Roller Bearing Co. While no actual demonstrations on gears were made during the visit, the method of breaking down sound and measuring it, were explained and demonstrated, an organ being used to produce the sound.

A. A. Ross, of the General Electric Co.; F. W. Sinram, president of The Van Dorn & Dutton Co.; A. F. Cooke, vice-president of the Fawcuss Machine Co., and H. E. Eberhardt, president of the Newark Gear Cutting Machine Co., were elected to the Executive Committee for three-year terms. Election of officers for the coming year was deferred to the June meeting of the Board of Directors in Cleveland.

IMPORTANT steps are being taken by the Spanish Government to promote the development of a national automobile industry. By a royal decree all Government Departments and institutions under Government control, when in need of automobiles, must purchase machines of native manufacture if the price asked does not exceed that asked for foreign machines by more than 10 per cent. Motor vehicles manufactured from native materials to the extent of 75 per cent will be free from all taxation for a period of three years if the price does not exceed 12,500 pesetas in the case of passenger cars and 25,000 pesetas for trucks. For vehicles built of native material to the extent of 50 per cent, only one half the normal taxes need be paid. It is hoped that these measures, together with the remission of the duty on machine tools, semi-manufactured and raw materials for the national automobile industry, which has been in force for some time, will lead to the building up of a strong and capable native automobile industry.

A COMMITTEE of inquiry appointed last year by the Japanese Government has made a report in which several measures are suggested designed to promote the development of an automobile industry in Japan. These include an increase in import duties, relief from taxation of firms entering the industry, preference given to Japanese products by Government departments and the Army, and production premiums. It is likely that the financial crisis which has set in in Japan in the meantime will interfere with the carrying out of these plans even if it should be favored by the Government.

IN an address recently made to the Manchester Chamber of Commerce by A. B. Houghton, American Ambassador to Great Britain, it was stated that behind every industrial worker in the United States stands an invested capital of \$6,000. That results in some four primary horsepower being put at the disposal of each worker. If one horsepower is assumed roughly to represent the power of 10 men, then the labor of each industrial worker in the U. S. is increased forty-fold.



Books for the Business Bookshelf

The Outlook for Aviation

Aircraft Year Book—1927. Aeronautical Chamber of Commerce of America, Inc., New York. 396 pp. Illus.

AVIATION activities in this country are constantly growing in importance and 1926 contained some very encouraging developments which are chronicled in full in this latest encyclopedia of aircraft information. The tone of the entire book this year is optimistic. Apparently there is not a cloud in the sky of hopes for rapid and successful progress in aviation activities. The Government has entered upon an intelligent development plan which is being carried out by persons eminently capable of handling the job; business men are quickly grasping the possibilities of air service not only as something for them to use but as something which contains excellent investment opportunities; the general public has acquired a tremendous interest in all matters pertaining to aircraft and seems only to be waiting for some means of more concretely expressing its interest by patronage; and the aircraft industry, itself, is exceptionally wideawake to the whole situation and is fully prepared to take advantage of every opportunity to further the interests of the aviation movement. The story of all these activities is related in a very pleasing manner in the Year Book and it is well worth reading by everyone, particularly those who still retain some degree of skepticism toward aviation.

Advertiser's Guide—New Edition

Dartnell Advertiser's Guide—1927. The Dartnell Corp., Chicago, 868 pp. \$5.

THIS latest edition of a well-known year book retains the standards set in previous years and contains such a complete set of valuable and interesting data pertaining to the placement of advertising that it seems as if few concerns who advertise could fail to obtain help from it.

Among the data contained in the book are a survey of county buying power; tests for selecting an advertising agency; advertising media; advertising in foreign countries, and considerable diverse information which may be desired at various times by advertisers.

Foreman Training—How and Why

Foremen'ship Training. Hugo Diemer. McGraw-Hill Book Co., New York. 230 pp.

TRAINING foremen and prospective foremen has become of considerable importance during recent years because of the growing realization of the important effect upon production efficiency which foremen have. This book is designed to give high executives of industrial concerns a clear picture of just what foreman training is and what it may be expected to accomplish and also to suggest effective methods to those responsible for the work. The author possibly has had as wide experience in this field as anyone and his suggestions are practical.

The Drafting Department

Organizing the Drafting Department. H. F. Church. The Ronald Press Co., New York. 133 pp. \$3.50.

FREQUENTLY, drafting departments owe their present condition to a method of evolution similar to that of the famous Topsy. A need was first seen for

making a few drawings and a draftsman or two hired for the job. As the work increased, so did the force, but often no particular effort was made to organize the department into a well-coordinated whole. This book is designed to furnish information necessary to install a well-organized drafting department or to revamp an old department into some semblance of order.

Speaking in Public

Everyday Public Speaking. Harry James Burtis. The Ronald Press Co., New York. 181 pp. \$2.25.

THIS is not a book on oratory. It is intended, rather, to assist salesmen and all business men who have occasion to speak before groups of listeners, no matter how small, for the purpose of selling an idea to them. To readers who have made any study of public speaking the book will likely seem elementary but it appears to contain most of the fundamental principles to be followed in presenting forceful, direct talks.

Handbook on Internal Gears

INTERNAL gears are used to a considerable extent in automotive engineering. One of their applications is the final drive of trucks and other heavy vehicles. On a well-known make of popular priced car they are used in the steering gear and in the planetary transmission, while in addition internally toothed members cut by the same methods as regular gears are often used for clutches, both the positive clutch of the direct drive and the friction clutch between the engine and the transmission whose slidably arranged disks are placed in driving connection with a hub or outer shell by involute-form splines.

A handbook on the internal gear has been published by the Fellows Gear Shaper Company of Springfield, Vt., and a third edition of this book has recently come from the press. It is written specially for the designer and discusses the properties of internal gears and the design of internal gear drives from every angle, as may be judged from the following list of chapter heads: Definition and Advantages of the Internal Gear; Design of Internal Gears; Graphical Analysis of Gear Tooth Action; Internal Helical Gear Design; Strength of Gear Teeth; Graphical Method of Generating an Involute Gear Tooth.

The Art of Grinding

THE art of grinding is such a diversified one that few men have a thorough knowledge of the whole subject. It is therefore fortunate that the Norton Co., one of the pioneers in the grinding industry, should have seen the necessity for a handbook giving information on the manufacture of abrasives and the art and practice of grinding for the use of production men. This book, entitled "Grinding—Wheels, Machines, Methods," was originally published about four years ago, and has now appeared in its second edition. It has been prepared by members of the executive and technical staffs of the Norton Co., but a considerable number of outside grinding experts have collaborated in the compilation of the material. The book is published by the Norton Co., Worcester, Mass., and sells at \$1.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Saturday, May 21, 1927

Orders on Hand Insure High First-Half Output

PHILADELPHIA, May 21—Continuance of high production of automobiles by manufacturing companies other than Ford Motor Co. is assured through the balance of the first half of the year by the large volume of orders now on hand. There is every reason to expect that the first half of the year will witness an increase in production over the first half of last year for the industry aside from the Ford company.

Shipments by manufacturing companies which are members of the National Automobile Chamber of Commerce, totaled 323,143 in April, a 1½ per cent reduction under March, but a 9 per cent increase over April, last year. The reduction under the March total is accounted for entirely by the difference in working days in the two months.

For the first four months of the year, N.A.C.C. members have manufactured 1,092,915 cars and trucks, an increase of 66,593, or 6½ per cent, over the first four months of 1926.

Conditions in the retail field are entirely responsive to weather conditions. Active demand is reported in practically all sections as favorable weather conditions exist. Improved cotton prices have helped automotive conditions in the South and promise to make this market active within a short period. The used car situation generally is sufficiently under control as not to interfere with new car movement.

Sloan Sees Better G.M. Operating Year

TOLEDO, May 18—President Alfred P. Sloan, Jr., predicted today the total General Motors retail sales in 1927 would run 5 to 10 per cent under last year but estimated that the corporation would close the year with a better operating result than in 1926.

Mr. Sloan made this statement in addressing representatives of 30 G. M. sales units in the Toledo territory. Speaking of used cars, he declared:

"The worst thing in the wonderful automobile picture today is the used car problem. It cannot be solved by a magic wand, and we are growing old too rapidly to wait for that kind of thing."

Walter Stumpf Killed

BALTIMORE, May 16 — Walter Stumpf, chief engineer of the Black & Decker Mfg. Co., Towson, Md., was killed, and William C. Allen, salesman for the company, was injured when a car driven by the former met with an accident and overturned. Mr. Stumpf was 35 years old, single, and had been with Black & Decker since his boyhood.

New Ford to Make July Debut, Report

Operation Suspension Expected May 28 and to Last Three to Four Weeks

DETROIT, May 17—Reports here indicate that the Ford Motor Co. will close most of its departments May 28 for three to four weeks to make factory changes necessary for its new model production.

A preliminary announcement of the new model is expected in some quarters about July 3. Some of the parts made up indicate that the new car will have a longer wheelbase, approximating 110 in., and that the radiator design will be changed. The car will have a new four-cylinder engine with water and oil pumps, it is reported, with a new transmission, but it is not definitely indicated whether it will have a standard gearshift.

Report Stirs Solons to Action

NEW YORK, May 18—A news agency dispatch from Detroit reports the Ford Motor Co. will cease production of the present Model T on May 28 and commence production on July 1 of a new model. The agency bases its report on the statement of Theodore P. Kolbe, secretary of the Detroit Police Department, who told the Common Council Ford would bring out the new car July 1 and recommended the immediate purchase for police work of 111 of the present models. Kolbe said his source of information was authoritative. He spoke of the model as embodying a standard gearshift.

A resolution authorizing the purchase was passed.

Cameron Denies Change

DETROIT, May 19—Denial that any change in the Ford car was contemplated was made by William J. Cameron, editor of the *Dearborn Independent* and Ford spokesman.

"There is no change to be made in

Hunt General Sales Manager for Star

OAKLAND, CAL., May 14—J. S. Hunt has been appointed national general sales manager for the Star car, according to a statement by Norman de Vaux, head of the Star Pacific Coast organization.

the car. It seems hardly likely a change would be made with a million of the Model T cars on the road already. Business is going along as usual if a little slow, but business has been slow in all lines," he said.

Car, Truck Output 397,566 for April

WASHINGTON, May 19—Automobile production in the United States during April totaled 397,566 passenger cars and trucks, compared with 430,523 produced in April of last year, a decrease of slightly more than 8 per cent.

March production, according to revised figures just announced by the Department of Commerce, was 386,841 passenger cars and trucks.

April production consisted of 353,071 passenger cars and 44,495 trucks. Canadian figures are not yet available.

Total production for the first four months of 1927 was 1,317,394, of which 1,152,373 were passenger cars and 165,021 trucks, compared with total production for the same period last year of 1,508,294, of which 1,357,708 were passenger cars and 150,586 were trucks.

Comparison of the 1927 and 1926 four-month periods shows a drop in totals of 190,900 cars and trucks. Truck production gained 14,435 this year over last, but passenger car output fell 25,315 under 1926.

Auburn Calls Meeting to Vote Stock Increase

CHICAGO, May 18—A special meeting of stockholders of the Auburn Automobile Co. has been called for June 22 to vote on a capital increase from 120,000 to 150,000 shares. E. L. Cord, president of Auburn, said the change in capitalization is in line with the growth of the company but no indication is given at this time of disposition of increased stock.

The company is in very strong financial position, he said, and now has cash or equivalent in excess of \$3,000,000 and no bank indebtedness. No financing of any sort is contemplated, either through sale of stock or otherwise.

Horning Hits Hand to Mouth Buying

Change Needed, He Says, if Industry is to Continue on Sound Basis

CLEVELAND, May 19—The extremes of hand to mouth buying as sometimes practiced by automobile manufacturers were vigorously criticized by H. L. Horning, president of the Motor & Accessory Manufacturers Association at a members' meeting in Detroit yesterday, the first of a series which was continued in Cleveland today.

"There is no substitute for good judgment in business," said Mr. Horning. "Orders must be placed a reasonable period in advance of delivery if the industry is going to continue on a sound basis."

David Beecroft, vice-president of Chilton Class Journal Co., told the members that the day when a manufacturer would sell effectively through a single class of jobber was passing, and he described some of the other changes going on in distribution.

Figures to show that the parts maker in the face of adversity has made his business sound and economical to a greater extent than the average of all industries or of car manufacturing, were presented by C. W. Miller, vice-president of Thompson Products, Inc.

Equipment Development Traced by Blanchard

NEW YORK, May 19—The Metropolitan Section of the Society of Automotive Engineers held its Mystery Session in the Hotel Woodstock tonight. The mystery was dispelled with the appearance of past chairmen of the section who made short talks.

The feature of the meeting was an interesting and illuminating talk on automotive equipment development by Donald Blanchard, editor of *Commercial Car Journal* and *Operation & Maintenance*. Among the important items discussed by Mr. Blanchard were brakes, air cleaners, fuel pumps, chassis lubrication, rectifiers, rubber and wheels.

The following newly elected officers were introduced: R. E. Plimpton, chairman; E. F. Lowe, vice-chairman; C. L. Drake, treasurer, and G. A. Round, secretary.

English Rubber Traders Sense End of Monopoly

WASHINGTON, May 17—English rubber traders are coming around to the view that the future of the rubber industry lies in the withdrawal of the British government's restriction scheme, it was announced by the rubber division of the U. S. Department of Commerce this week.

The "Evening Standard" of London has put forward the view, which is

meeting with popular approval, that the British plan of restricting imports in order to protect the world market price actually is threatening the English control of world production of rubber.

Dutch planters, it was stated, will produce to their full capacity and will take more and more of the British share of world markets.

Marvel Adds \$2,318,960 for Expansion Program

DETROIT, May 18—The Marvel Carburetor Co., of Flint, has sold 56,560 shares of \$10 par common stock through John Burnham & Co. and Paul H. Davis & Co., of Chicago, at \$41 a share, as part of the expansion program that has been going on this year. Later an Illinois corporation will be formed to take over the entire business.

Growth of the Marvel company since its organization in 1908 has been phenomenal. Its original capitalization of \$10,000 previous to the present issue, had been increased to \$750,000 through reinvestment of earnings. Profits last year were \$670,300 or nearly \$9 a share on the 75,000 shares outstanding on which annual dividends of \$3.20 are being paid. Earnings for the first four months of the present year were \$221,737.

Midland Steel Purchases Steeldraulic Brake Rights

CLEVELAND, May 18—Midland Steel Products Co. has obtained exclusive rights to the manufacture and sale of the Steeldraulic brake, according to announcement of President E. J. Kulas. The brake will be manufactured in sizes to fit the popular run of cars and production is expected to start within a few weeks.

The Steeldraulic brake, invented by John Sneed, of Detroit, was described in detail in the May 14, 1925, issue of *Automotive Industries*, on page 850.

Seiberling Sales Total \$4,368,000 to April 30

AKRON, May 18—Net sales of Seiberling Rubber Co. for the first four months of 1927 totaled \$4,368,000, compared with \$3,719,000 in the same period of 1926. Although prices were 30 per cent lower than in 1926, net dollar sales showed an increase of 19 per cent.

Frank A. Seiberling, president, estimated that there would be a 10 per cent increase in tire production this year over last year, and that balloon tires would exceed 60 per cent of the total production.

Suit Over Balloon Tires

DETROIT, May 16—The Steel Wheel Corp. of Lansing has brought suit against the Goodrich Rubber Co. of Detroit, alleging in its complaint that the Goodrich company is making balloon tires in infringement of the patent rights of one Alden L. Putnam. Goodrich has not yet filed answer.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co.

NEW YORK, May 19—Despite the adverse effects of continued bad weather, trade activity remains at a high level. Moderate recession is reported in a number of industrial branches, probably due in the main to seasonal influences. Commodity prices in general declined last week, while stock prices moved upward. Money rates were stationary at a low level.

Industrial activity last month, computed on the basis of electric power consumption, was the highest on record, exceeding by 4 per cent the March level and by 5 per cent that of April last year.

FREIGHT CAR LOADINGS

Railway freight loadings during the week ended April 30 numbered 1,026,440 cars, which compares with 955,215 cars in the preceding week and 995,408 cars in the corresponding period last year. Loadings for the year to date total 17,255,824 cars, as against 16,773,991 cars a year ago.

OIL PRODUCTION

A new peak was reached in crude petroleum production during the week ended May 7, with an average daily output of 2,506,400 barrels, as compared with 2,499,950 barrels a week earlier and 1,994,050 barrels a year ago. Gasoline prices declined further last week, while prices of crude oil remained unchanged.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended May 11 were 12.5 per cent below the total for the preceding week but 12.7 per cent above that for the corresponding period last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices stood at 139.6 last week, as against 140.1 a week earlier and 140.1 four weeks earlier. The index of the Bureau of Labor Statistics fell from 145.3 in March to 144.2 in April.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks declined \$139,200,000 during the week ended April 11, with decreases of \$65,700,000 in discounts, \$11,200,000 in open market purchases and \$62,400,000 in holdings of Government securities. Note circulation declined \$2,400,000 and deposits \$63,500,000, while reserves increased \$27,700,000. The reserve ratio rose from 78 to 80 per cent.

During the same period, loans of reporting member banks declined \$35,000,000, a decrease of \$62,000,000 in security loans being partially offset by a gain of \$27,000,000 in "all other" loans. Investments increased \$27,000,000, net demand deposits \$41,000,000 and time deposits \$22,000,000, while borrowings from the Federal Reserve banks declined \$76,000,000. For the first time in many weeks, there was a small decline in loans to brokers in New York City.

The call loan rate continued to range between 4 and 4½ per cent last week.

New Company Takes Over Canadian Lamp

Change Made Desirable by Tariff Provisions—Currie Lang is the President

FORD, ONT., May 16—Canadian Motor Lamp Co., Ltd., has been organized here to take over the Canadian Lamp & Stamping Co., Ltd., which has been owned entirely by the Edmunds & Jones Corp., for a number of years, but which recently became part of the C. M. Hall Lamp Co., when the latter took over the Edmunds & Jones company.

The new company will be an independent company and not a subsidiary of the C. M. Hall company. Both the Hall company and the Thos. J. Corcoran Lamp Co. are interested in the new company and have working agreements with it in reference to supplying the Canadian automobile lamp trade.

Directors of the new company are Currie Lang, president and general manager; W. F. Anklam, president of C. M. Hall Lamp Co.; G. P. Doll, president of Thos. J. Corcoran Lamp Co.; J. B. Macon, treasurer, and Albert Matthews, president of Matthews & Co., Ltd., Toronto.

There will be no change in the business policies of the former company and the executive management will not be changed in any way. Additional cash has been put into the business to take care of expected increase volume and to provide for necessary plant improvements. Provisions of the new Canadian tariff regulations have made the change in ownership desirable.

The C. M. Hall Lamp Co. will have new cash assets for expansion of its business, it was revealed with the announcement of the sale.

Total assets of the company, exclusive of goodwill, are listed at \$478,000.96. The amount involved in the sale was not revealed.

W. A. Lark is Elected Secretary of Briggs

DETROIT, May 16—W. A. Lark, assistant secretary and assistant treasurer of Briggs Mfg. Co., was elected secretary at the annual meeting, succeeding H. W. Griffith. He also continues as assistant treasurer. All other officers and directors were reelected.

President John H. French in his annual report said 1926 was a year of substantial progress for the company. Among the new business added during the year were contracts from Dodge Brothers, Inc., and the Chrysler Corp.

Link Starts New Plant

CHICAGO, May 16—Work has been started on the new Canadian factory of Link Belt, Ltd., at Toronto. With the new Canadian plant the factories of the company, with subsidiaries, will number 11. Link Belt has 13 warehouses and 37 branch offices.

Three Companies Add New Models

PHILADELPHIA, May 16—New models were announced by three companies during the week.

Hudson Motor Car Co. added a five-passenger de luxe sedan to the Essex line, priced at \$895.

Chandler-Cleveland Motors Corp. added a three-passenger coupe, priced at \$1,675, on its Big Six chassis; a five-passenger sedan de luxe priced at \$1,345 on its special six, and a three-passenger coupe priced at \$2,195 on the Royal straight eight.

Gardner Motor Co., Inc., added four models to its 80 line—a five-passenger brougham coupe at \$1,695; four-passenger victoria coupe at \$1,695; five-passenger brougham coupe de luxe at \$1,795, and a four-passenger victoria coupe de luxe at \$1,795.

Farm Survey to Be Ready in Summer

NEW YORK, May 12—Report by the Business Men's Commission on Agriculture, of which Alfred H. Swayne of General Motors is a member, will be filed this summer, following the conclusion of a survey which it has undertaken throughout the leading farming districts of the country. Hearings are still to be held in several cities.

It is intimated that the commission will find that the country's heritage of fertile land is being impaired and that for some time, if not for many years, the nation has been living on its agricultural capital. A statement by Charles Nagel, chairman of the commission, said that some rural sections of the country were reported as practically bankrupt and are for the time being carried by the more prosperous cities of the state in which they are located. His statement said that even the most efficient farmers seem of recent years to have done little better than hold their own.

The most favorable aspect of the present farm situation is held by Mr. Nagel to be the educational work now being carried on by national and state agencies.

King Holds Sales Parley

BUFFALO, May 14—The semi-annual sales meeting of the King Mfg. Corp. was held here this week. Talks were given R. W. Webb, president; B. G. Close, vice-president; H. W. Stickle, vice-president, and by J. W. Million, Jr., W. L. Morley, G. R. Buckley and R. K. Smith, engineering staff members.

Austin Opens Branch

CLEVELAND, May 16—The Austin Co., engineer and builder, has opened a branch office at Cincinnati with H. L. Cornelison as manager. The Chicago headquarters of the Austin company have been moved to larger quarters at 510 N. Dearborn St.

Velie Head Denies Merger Under Way

Says Company Will Continue Independent and Cites Gains
—McEwen Resigns

MOLINE, May 14—W. L. Velie, president of the Velie Motors Corp., this week denied rumors which had been circulated in local automotive circles, relative to a merger of the Velie plant with a larger concern in the manufacturing field. Mr. Velie said the corporation will continue as an independent.

"Persistent propaganda campaigns have been circulated through innuendoes and even open declaration regarding mysterious mergers and regarding cars that are going to be orphaned by these mythical mergers," Mr. Velie said.

Yet Velie's experience during the first quarter of the present year is ample proof that the small, progressive, wide-awake company can not only survive but make a good showing in the face of severe competition. Velie shipments in February were 61.7 per cent greater than in February, 1926, and March shipments ran 47 per cent ahead of March of last year while April shipments will show comparable increases.

Edwin McEwen, for the last three and one-half years general manager at the Velie Motors Corp. factory here, has resigned and has indicated that he will return to his former home in Cleveland. His successor has not been announced. W. L. Velie, Sr., president of the corporation, is in active charge of operations.

G.M. Truck Moves Two Departments to Detroit

DETROIT, May 15—The sales and promotion departments of the General Motors Truck Co. have been moved from Chicago to Detroit, and will be quartered on the eleventh floor of the General Motors building, according to P. L. Emerson, vice-president in charge of sales. The move was designed to bring the general offices of the truck division closer to the enlarged General Motors truck plant at Pontiac, for the benefit of visiting branch managers, dealers, fleet buyers and others. The company plans to maintain passenger car service between the factory at Pontiac and the offices in Detroit.

Stearns Starts Exporting

CLEVELAND, May 16—The F. B. Stearns Co. inaugurated export activities with the shipping of 20 cars in April to five countries—Brazil, England, Australia, Switzerland and Guatemala. A considerable volume of business is anticipated from the export field in the next few months following the commencement of company sales efforts.

G.M. Breaks Sales Record With 180,106

Division Sales of 169,067 in April Also Set New All-Time Mark

DETROIT, May 14—The combined April sales by dealers to users of General Motors cars totaled 180,106 cars, compared with 136,643 cars in April, 1926, and 97,242 automobiles in April, 1925. April sales, according to Alfred P. Sloan, Jr., president, for the second successive month set a new high record for all time.

The April car sales by the corporation's divisions to dealers totaled 169,067 cars compared with 122,742 in April, last year, and 85,583 in April, 1925. This is also a new all-time record and the second consecutive month during which this has been accomplished.

Following is a table of sales by dealers to owners and sales by the corporation to dealers:

Dealers Sales to Users		1927	1926	1925
Jan.	81,010	53,698	25,593	
Feb.	102,025	64,971	39,579	
Mar.	146,275	106,051	70,594	
Apr.	180,106	136,643	97,242	

Divisions Sales to Dealers		1927	1926	1925
Jan.	99,367	76,332	30,642	
Feb.	124,426	91,313	49,146	
Mar.	161,910	113,341	75,527	
Apr.	169,067	122,742	85,583	

Brazilian Car Imports Show 20% Gain in 1926

WASHINGTON, May 14—Brazil, according to a survey just made by agents of the Department of Commerce, is characterized as the second best South American market for American cars, with conditions especially favorable for sales of trucks. Argentina is rated as the best Latin-American market.

Brazilian imports of all automotive products in 1926 totaled \$17,217,000, of which \$10,192,000 were from the United States. The 1926 imports from the United States were 20 per cent over those of 1925, which were in turn 161 per cent over the 1924 imports.

Pontiac Chassis \$585

PONTIAC, May 16—The Pontiac delivery chassis is being offered as a chassis by the Oakland Motor Car Co. at \$585. A special cowl is provided to which any style of body may be fitted. There is provision for carrying the spare tire in a depression on the left front fender.

Reo Employs Over 6000

DETROIT, May 15—Exclusive of office and clerical help there are now more than 6000 employees on the payroll of the Reo Motor Car Co., according to employment figures just released by that manufacturer.

300 Daily is New Erskine Schedule

SOUTH BEND, May 16—Increased export demand for Erskine cars with an increase of domestic business has brought the production schedule to a new high point of 300 daily. South American territories alone will take 2500 Erskine cars during May and June.

Stutz Net Profit \$365,512 for 1926

Net Sales \$11,426,849, as Compared With \$2,420,336 in Year Previous

NEW YORK, May 16—Stutz Motor Car Co. reports net profit of \$365,512 for the year ended Dec. 31, 1926, after expenses, interest, etc., equivalent to \$1.56 a share earned on 232,827 shares of no par stock outstanding. This compares with net loss of \$1,660,385 in 1925, incurred after deducting all expenses of development of the new Stutz line and the writing off of all inventory and equipment on the discontinued models.

The income account of 1926 shows net sales of \$11,426,849 as against \$2,420,336 in 1925. After deduction of costs and expenses, totaling \$10,886,475, and a loss in branch operation of \$84,254, the operating profit in 1926 was \$456,120.

Ajax Expansion Provides Continuing N. Y. Offices

NEW YORK, May 16—Clearing up confusion with regard to the plans of the Ajax Rubber Co., Inc., an official has announced a program of expansion of production facilities at Racine. The company will continue to maintain executive offices in New York City but at a later date some departments will probably be moved to Racine.

Due to loss of production at Trenton in previous years during the hot weather, the company may find it more economical to curtail or temporarily discontinue production at Trenton, but in this case it is expected to be only of temporary duration.

Timken Interests Railmen

DETROIT, May 16—Inquiries are being received by Timken-Detroit Axle Co. from street railway companies for quotations on supplying its new electric railway type of axle. The axle follows automotive practice and preliminary demonstrations have met with much interest from railway officials. No additional plant equipment will be required to build the new axle.

Profit of £1,000,000 for Morris Motors

Total is Under 1925 But Elates Directors, Who Point to Industrial Unrest

LONDON, May 13 (*by mail*)—Morris Motors Co., which took over W. R. Morris' main motor-manufacturing business as from the beginning of last year, shows in its first report trading profits and interest amounting to £1,001,634 on a capital of £5,000,000, consisting of £3,000,000 7½ per cent preference shares and £2,000,000 ordinary stock.

The prospectus issued last July showed that the profits for 1925 were £1,235,545 before including any interest on the £769,500 of 5 per cent War Bonds taken over by the new company. Thus there has apparently been a decline of over £250,000 in profits.

The directors state that they consider the result most satisfactory in view of the general disturbance to trade due to the general and coal strikes in 1926 and the difficulties that had to be overcome in changing the model during a period of industrial unrest.

The directors recommend that no dividend should be paid on the £2,000,000 of ordinary shares (which were all issued as part of the purchase considerations for the business) but that the whole of the available profits be used to strengthen the company's position.

Fiat to Put Weymann Body on 8 hp. Chassis

PARIS, May 11 (*by mail*)—A license for the construction of Weymann flexible fabric leather bodies has been taken out by the Fiat company, Italy's biggest automobile manufacturer. It is understood that Fiat intends to put the Weymann body into construction on its 8 hp. chassis, which is its biggest production line, at a very early date. Fiat has its own body shops at Turin, reputed to be the best equipped in Europe.

Gardner Half to Equal '26

ST. LOUIS, May 16—Sales of Gardner cars in the first six months of 1927 will equal sales in the full year 1926, according to report from Gardner Motor Co., Inc. Production in May has been increased and profits during the month are expected to exceed \$100,000. The factory is operating on two 12-hour shifts.

Chevrolet Opens New Zone

SAN FRANCISCO, May 16—New Chevrolet zone offices have been opened in Butte, Mont., with A. Parker in charge, according to E. W. Fuhr, regional sales manager for the Pacific Slope for the Chevrolet Motor Co. Mr. Parker, who comes from the Portland office, will be succeeded by B. W. Bush.

Men of the Industry and What They Are Doing

Weschler Leaves Indian to Head Worcester Chain

Claude Douthit of the firm of Danforth & Marshall, New York stock brokers, has been elected president of the Indian Motocycle Co., to succeed Frank J. Weschler, who becomes president, treasurer and general manager of the Baldwin Chain & Mfg. Co., of Worcester. Louis E. Bauer, who joined the Indian organization last winter, succeeds Mr. Weschler as general manager. Mr. Bauer is a director and chairman of the executive committee.

Mr. Bauer came here from the Servel Corp. of New York. He had previously been active in Springfield, Ohio, where he was president of Springfield Leather Products Co. and vice-president of Bauer Bros. Co.

Mr. Weschler went from Pope Mfg. Co. to the Hendee (now Indian) company in 1906 as sales manager. In 1910 he became treasurer, in 1922 general manager and in 1923 president.

Theis Servel Plant Manager

E. F. Theis has resigned as factory manager of the Larrabee-Deyo Truck Co., and has accepted a position as factory manager of the Servel Mfg. Co., Evansville, Ind. He will act as assistant to F. P. Nehrbas, vice-president and general manager.

Siebert Gets Van Dorn Branch

Milton A. Siebert has been appointed Kansas City branch manager for the Van Dorn Electric Tool Co. Mr. Siebert previously had been located in Detroit where he worked with national service managers in promoting the use of Van Dorn equipment.

Join Climax Sales Staff

H. P. McCullough and E. H. Crippen have been added to the sales organization of the Climax Engineering Co., Clinton, Iowa. Mr. McCullough to be located at Houston, Tex., and Mr. Crippen at Fort Worth, Tex.

Hoadley Leaves Novo Engine

D. R. Hoadley, secretary, director and acting treasurer of the Novo Engine Co., Lansing, has resigned, effective June 1. Mr. Hoadley has been with the Novo company for 13 years, starting as advertising manager.

Hess President's Assistant

D. P. Hess, for six years manager of the Columbus, Ohio, plant of the Timken Roller Bearing Co., has been appointed assistant to the president of the company with headquarters at Canton.

Johnson Inspects Plant

Basil Johnson, managing director of Rolls-Royce, Ltd., of Derby, Eng., has been paying an inspection visit to the works of Rolls-Royce of America, Inc., in Springfield, Mass.



William R. Wilson

Who resigned as president of the Guardian Trust to become president of the Murray Corp. of America

Blum Arrives on Visit

Charles Blum, president of the Charles Blum Co., of Paris, manufacturer of Latil trucks and tractors, has arrived in New York with the intention of spending about six weeks in the United States visiting automobile factories and manufacturing centers. The Blum company is one of the oldest in France producing commercial vehicles only, the firm having specialized for the last twenty years in front wheel drive trucks and later in four wheel drive tractors.

Cronkite Subs for Holmes

George S. Cronkite has been appointed acting traffic manager of the Franklin Automobile Co., the appointment to be effective during the absence of Traffic Manager C. D. Holmes, who is on a protracted stay in the Adirondacks. He is not expected to return to his desk until late in the summer.

Conybeare on A. B. C. Board

S. E. Conybeare, advertising manager of the Armstrong Cork Co., and president of the Association of National Advertisers, has been elected a member of the board of directors of the Audit Bureau of Circulations. He will fill out the unexpired term of B. H. Bramble.

Van Sicklen Recuperating

N. H. Van Sicklen, Sr., formerly publisher of *Motor Age* and later identified with a number of automotive manufacturing enterprises, is ill at the Jackson Park Hospital in Chicago where he is recovering from an operation.

Servas to Have Charge of N.S.P.A. Exhibition

John A. Servas has been appointed manager of the National Standard Parts Association show to be held in Cleveland the week of Nov. 14. Mr. Servas for a number of years has been manager of the exposition department of the Hotel Sherman, Chicago, where the first N. S. P. A. show was held in 1925.

The show committee in whose charge this year's N. S. P. A. convention and show is to be given, is composed of C. M. Burgess, Burgess-Norton Mfg. Co., chairman; Ira Saks, Accurate Parts Mfg. Co.; Dave Rosenbach, W. D. Foreman; E. R. Blake, Detroit-De Luxe Co.; V. C. Anderson, Motor & Axle Parts Service; Jack Buckley, Jack Buckley Motor Supply, with W. C. Stettinius, American Hammered Piston Ring Co., president of the N. S. P. A., and E. P. Chalfant, executive vice-president, members ex-officio, and Robert Macfee, secretary of the N. S. P. A., secretary.

Creighton and Barnett Named

L. E. Creighton has been appointed vice-president in charge of operations of the Union Drawn Steel Co., Beaver Falls, Pa. Mr. Creighton has been with the company since July, 1910. He was formerly head of the order and invoice department and production manager.

Russell B. Barnett has been designated assistant to the general manager of the Union Drawn Steel Co.

Gunther Shifted to Buffalo

G. A. Gunther has been made manager of the Buffalo office of Chain Belt Co., succeeding T. E. Cocker, who is now in charge of the Cleveland office. Mr. Gunther previously has been connected with the sales department in the home office.

H. J. Miller Makes Change

Henry J. Miller, for the past three years sales manager for the American Auto Lamp Co., has been appointed vice-president in charge of sales of the Peerless Cushion Wheel, Inc., 455 Seventh Ave., New York City.

Williams Lap Fund Chairman

G. M. Williams, president of the Marmon Motor Car Co., will be chairman again this year of the lap fund committee in charge of raising \$20,000 to be given to drivers in the annual Indianapolis race.

Kent With Bridgeport Brass

Robert T. Kent, until recently superintendent of prison industries of the State of New York, has been appointed general manager of the Bridgeport Brass Co., Bridgeport, Conn.

Industry's Orders Boon to Steel Mills

Fender Stock Prices Raised to "Smoke Out" Business— Good Alloy Demand

NEW YORK, May 19—Compared with other lines of steel consumption, the automotive industries play the part of "Lady Bountiful" in the market. While there is a dearth of backlog and strong pressure on prices in the heavy rolled steel products section of the industry, automotive sheet consumers have placed enough business to relieve the mills from anxiety regarding operating schedules over the next five or six weeks, and, while they have by no means ratified the new asking prices of the sheet rollers, they have paid in many instances higher prices than they could have bought at in April.

Encouraged by the partial success of sheet rollers in putting the market on a firmer basis and "smoking out" business that was hanging fire, cold-rolled strip producers have lifted prices on fender stock to 4.80 for No. 22 gage and 4.75 for No. 17 to 21 gage. They have also made general the method of basing prices on 1-ton lots, with a progressive differential, ranging from 10c per 100 pounds to 25c for larger orders to be shipped at one time.

Wage Parley Not Feared

Better demand for automotive alloy steels is reported by Ohio mills. In full-finished automobile sheets, leading consumers are believed to have been well covered at the old price of 4.15, Pittsburgh, for their requirements up to July 1, but there has been and continues to be some odd lot buying at the new 4.25 asking price. Wage conferences between the steel producers and their operatives, scheduled for next week at Atlantic City, hardly can have any influence on the market.

Pig Iron—Automotive foundries appear to be well covered for their immediate requirements. Very little interest is shown so far in third quarter shipments. In Detroit, the market for foundry iron continues at \$19.50, furnace. The Valley quotation is unchanged at \$18.50, furnace.

Aluminum—Automotive buying of aluminum is made up of many driblets. Imports continue almost negligible. Prices are unchanged. In the outside market, the domestic producer's prices are shaded to the extent of about $\frac{1}{2}$ c per pound, with the exception of No. 12 alloy, virgin, which seems to be steady all around at 24 $\frac{1}{2}$ c. Remelted No. 12 is quoted at 20 $\frac{1}{2}$ @ 21c.

Copper—Both Connecticut Valley and Michigan consumers appear to be able to buy copper at 13c. Domestic demand is disappointing. Artificial curtailment of production has about run its course.

Tin—English and German 99 per cent Lamb and Flag tin is offered at 4c per pound below Straits, and quite a few consumers have bought small lots.

Lead—Some metal is being bought by storage battery manufacturers for nearby shipment. The market rules quiet and easy.

Zinc—Consuming demand is very light.

Financial Notes

Motor Wheel Corp. has declared the regular quarterly dividend of 50 cents a share on the common, payable June 20 to stockholders of record June 1.

Motor Wheel Corp. has notified stockholders that it will retire this year the entire preferred stock, of which 9788 shares are outstanding. One-half the stock has been called for redemption between May 16 and June 1 at \$115 a share, and the balance will be called later in the year.

American Bosch Magneto Corp. for the quarter ended March 31, 1927, reports profit of \$42,782 after depreciation, etc., but before Federal taxes, comparing with \$138,908 in first quarter of 1926. Company has outstanding 207,399 shares of no par stock. Operations for first quarter last year included sales of starting and lighting equipment to Hudson Motor Car Co. The starting and lighting division was later sold to Electric Auto-Lite.

Goodyear Tire & Rubber Co. declared the regular quarterly dividend of \$2 on the 8 per cent cumulative prior preference and \$1.75 on the 7 per cent cumulative preferred, both payable July 1, the prior preference to stock of record June 13 and the preferred to stock of record June 1.

Eaton Axle & Spring Co. for the quarter ended March 31, 1927, shows profit of \$274,853 after charges but before Federal taxes, against \$203,639 in first quarter of 1926. Stock outstanding consists of 250,000 no par shares.

Marvel Carburetor Co. capital stock has been increased with the sale of 56,560 shares of its \$10 par capital stock at \$41 a share by Chicago financial interests.

Willys-Knight Great Six Models Cut \$100 to \$300

NEW YORK, May 17—Price reductions of four Willys-Knight Great Six models were announced this week by Willys-Overland, Inc. The models and new prices are as follows:

Model	New Price	Old Price
Sedan	\$1,995	\$2,295
Foursome	2,095	2,295
Cabriolet Coupe	1,995	2,295
Roadster	1,850	1,950

More Crude Rubber Used

NEW YORK, May 17—Crude rubber used in the first quarter of 1927 in the manufacture of tires and tire sundries totaled 78,577 tons as against 73,081 tons in the first quarter of 1926. Crude rubber on hand at the end of the first quarter totaled 82,233 tons as against 58,191 at the end of the 1926 quarter. Reclaimed rubber on hand totaled 21,508 tons. Scrap rubber totaled 62,807 tons.

Mindanao Rubber Output Gains

NEW YORK, May 17—Output of rubber in Mindanao this year will approximate 250,000 kilos, as compared with 200,000 kilos in 1926, according to estimates of the American and Basilan rubber companies.

Goodyear Legal Tilt Ends in Compromise

Voting Trust to be Ended— Refinancing Includes Public Bond Offer

NEW YORK, May 16—The legal battle for control of the Goodyear Tire & Rubber Co., which has been waged in the courts of Ohio and New York for the past several months between stockholders of the company on one side and company bankers, has been settled out of court through a compromise agreement. Under the terms of this agreement all voting trust will be terminated and an independent board of directors elected. Dillon, Read & Co. will continue to act as bankers of the company.

The refinancing plans, which were the immediate cause of the controversy, under the terms of the agreement will consist of a public offering in the near future of an issue of \$60,000,000 of 5 per cent bonds, the proceeds of which are to be devoted to the retirement of the 8 per cent first mortgage bonds, the 8 per cent debentures and the 8 per cent prior preference stock issued in connection with the reorganization of 1921. This refinancing is expected to result in material savings in fixed charges to the company.

No Management Change

The new board of directors will include representatives of all classes of stockholders. Dillon, Read & Co., and John Sherwin, Cleveland banker, will be represented. No change in the management of the company is contemplated. Paul W. Litchfield will remain as president.

The financial plan agreed upon is in most essentials the so-called Litchfield plan, proposed by Mr. Litchfield and modified to meet the interests of all parties.

Stewart-Warner Nets \$1,062,048 for Quarter

CHICAGO, May 17—Stewart-Warner Speedometer Corp. and subsidiary companies report net income of \$1,062,048 for the first quarter of the year after full provision for Federal taxes and other charges. This compares with \$1,353,102 in the first quarter of last year. Surplus as of March 31 was \$5,945,255 after deducting dividends of \$913,187.

Canada Ships More Tires

WASHINGTON, May 16—A new all-time record for exports of automobile tire casings from Canada was established in March, when 197,998 casings, valued at \$1,867,152, were shipped. This total exceeded the previous record, made in February, by 22,296 casings, although the unit value decreased from \$10.17 in February to \$9.43 in March.

18 U.S. Firms Seek Paris Show Space

American Cars to be Shown in London Following International Exhibit

PARIS, May 10 (*by mail*)—Eighteen American automobile manufacturers have applied for space in the annual French automobile show, to be held in the Grand Palais, Paris, from Oct. 6 to 16. The firms are Auburn, Willys-Overland, Chrysler, Studebaker, Lincoln, Ford, Buick, Packard, Dodge, Paige, Hupmobile, Chevrolet, Oldsmobile, Marmon, Pierce-Arrow, Elcar, Cadillac, Oakland and Pontiac. The show is completely international for the first time since 1913, and in addition to French and American will include cars from Germany, Austria, Italy, Switzerland, Belgium, and Czechoslovakia.

The total number of exhibitors in all classes is about 1100, every available inch of space being rented and the possibility having to be faced of a reduction in stand area. This year there will be no truck show in Paris.

London will open its show two days before Paris closes its doors, and in order to permit the new models being shown in Great Britain a special train and boat will be run from Paris, thus allowing the cars to reach Olympia on the opening day of the show. Special arrangements are being made for the Paris show models to be received after the official opening.

French Prepare for International Meeting

PARIS, May 10 (*by mail*)—Every automobile manufacturing nation in the world will be represented at the international gathering of the Bureau Permanent, in Paris, on June 18, when Roy D. Chapin, president of the National Automobile Chamber of Commerce and Alfred Reeves, general manager of the Chamber, will attend as American delegates. Although no official intimation has yet been received here, there is a possibility of Windsor T. White and John N. Willys also attending.

The nations to be represented will comprise France, England, United States, Italy, Belgium, Germany, Austria, Switzerland and Czechoslovakia.

Dodge Canada Sales Fall

DETROIT, May 16—Sales of Dodge Brothers of Canada for the first four months of 1927 were 1851 cars as against 2256 for the first four months of 1926. April shipments were 710 against 810. The decline was ascribed to unfavorable weather conditions in western provinces, as business in Quebec and most of Ontario and the maritimes shows substantial gains. Graham truck division, Canadian company, April retail deliveries were 128.

Fred Wagner to Drop Last Flag This Year

SAN FRANCISCO, May 16—Fred J. Wagner, who for more than 40 years has been officiating as a starter for bicycle, automobile and motorcycle races, has announced that he will retire permanently after starting the Culver City, Charlotte and Atlantic City events this year. He is 63 years old, and became an automobile racing starter in 1899, after 13 years of bicycle contest starting. His first automobile race starting job was at the old Washington Park track in Chicago, when the speed record was 30 m.p.h.

March Casing-Tube Inventories Mount

Increase Recorded When High Production Rate Exceeds High Shipment Mark

NEW YORK, May 14.—Although in March shipments of casings and inner tubes increased materially over February, production was stepped up at even a faster rate, resulting in a gain in inventories, according to the figures of the Rubber Association of America, Inc. Comparisons follow:

Pneumatic Casings—All Types			
	Inventory	Production	Shipments
Mar. 1926	9,003,630	4,092,036	3,421,076
Feb. 1927	8,281,317	3,821,978	3,344,071
Mar. 1927	8,687,312	4,707,672	4,276,107

Inner Tubes—All Types

	Inventory	Production	Shipments
Mar. 1926	14,348,072	5,272,456	3,740,321
Feb. 1927	12,056,747	4,244,233	3,840,194
Mar. 1927	12,822,004	5,988,312	4,618,365

Balloon Casings

	Inventory	Production	Shipments
Mar. 1926	2,626,745	1,855,022	1,676,170
Feb. 1927	3,244,752	2,017,711	1,886,975
Mar. 1927	3,500,757	2,709,647	2,440,651

Balloon Inner Tubes

	Inventory	Production	Shipments
Mar. 1926	3,241,677	2,196,118	1,803,394
Feb. 1927	4,200,796	2,251,634	2,012,852
Mar. 1927	4,706,834	3,081,618	2,546,176

High Pressure Cord Casings

	Inventory	Production	Shipments
Mar. 1926	5,159,199	1,840,268	1,526,416
Feb. 1927	4,376,726	1,696,973	1,377,080
Mar. 1927	4,534,254	1,920,170	1,746,474

High Pressure Inner Tubes

	Inventory	Production	Shipments
Mar. 1926	11,196,395	3,076,338	1,936,927
Feb. 1927	7,855,951	1,992,539	1,827,342
Mar. 1927	8,115,170	2,306,694	2,072,189

Lord Guardian Head

Takes Post Vacated by Wilson for Murray Presidency

DETROIT, May 14—Robert O. Lord, president of the Guardian Detroit Bank, has been elected president of the Guardian Trust Co. succeeding William Robert Wilson, who resigned last week to assume the presidency of the Murray Corp. of America. Mr. Wilson will continue as a member of the organization committee of the Guardian group of financial institutions and as a director of the Guardian Trust Co.

Mr. Lord was recently named to head the Guardian Detroit Bank, which is now being formed with the backing of many leading Detroit automotive men. He was connected with the Harris Trust & Savings Bank in Chicago for 21 years before coming to Detroit to join the Guardian interests.

Oakland Offers New Colors

DETROIT, May 16—New color combinations are now being offered in the finish of Oakland cars, utilizing shades and tints of blue and green. Cobalt blue is used on the four-door sedan with ivory white body striping. Sedan is finished in Trouville blue with ivory white striping. The roadster comes in Avalon blue striped with burnt orange. The landau sedan and landau coupe are finished in Alpine green with Aberdeen green fenders and burnt orange striping.

Electric Truck Book Out

NEW YORK, May 16—A booklet has been published by the Society for Electrical Development citing the methods employed by central stations in promoting the use of electric trucks. The booklet is entitled "Get These Off-Peak Dollars," and is published in connection with the market development program of electrical manufacturers.

Tyree Creditor Proposes

F. R. Young as Reorganizer

BLOOMINGTON, ILL., May 14—Reorganization of the Tyree Radiator Co. with \$75,000 new capital is being proposed to rehabilitate the plant here. E. K. Richmond, representing the Dallas Brass & Copper Co., one of the largest creditors, has recommended Fred R. Young, former Racine, Wis., radiator manufacturer, to head the organization work. One of Mr. Young's conditions is that 51 per cent of stock be placed with him in escrow pending return of the company to a paying basis, at which time he will be permitted to acquire that interest.

The new capital, Mr. Young believes, will complete purchase of new equipment and erection of a unit to make possible construction of an entire radiator at the plant instead of the replacement cores now built there.

Deere Plans New Tractor

MOLINE, ILL., May 14—The John Deere & Co. factory here this week announced new buildings and production expansion which will add 300 men to its force within a few months. The first unit of the new plant is a light tractor factory, 120 x 300 feet, and the city has agreed to vacate six blocks of a city street to afford the plant the required facilities.

DURYEA TELLS OF AVIATION INTEREST BEFORE TURNING TO AUTOMOBILE DESIGN

SPRINGFIELD, MASS., May 16—Charles E. Duryea, inventor of the Duryea automobile, who in 1892 built his first car in the shop of the John W. Russell & Sons Co. here, was guest of honor at a banquet of the Springfield Publicity Club, May 10, when that body presented to him the Pynchon Medal "in recognition of his services to the world." Mr. Duryea's car is said to have been the first successful gasoline car.

Mr. Duryea at that time was traveling for a bicycle concern. His brother, J. Frank Duryea, later of the Stevens-Duryea company, worked with William J. Russell, now president of the John W. Russell & Sons Co., in developing models. The first car built was a single-cylinder and the second was a three-cylinder. Plans were drawn for a six-

cylinder, but it was not built because it was regarded as too expensive to manufacture.

In addressing the Publicity Club, Mr. Duryea told of his struggles to bring out his car and also of his early interest in aviation, dating from 1876. He said: "In the Springfield Republican of June, 1891, and April, 1892, I published descriptions and cuts of machines which modern plane makers say will fly, and also a method of using them with perfect safety. We could have flown a dozen years earlier than we did if a man with vision and money had appeared, but I had not the means to go on with the work."

Mrs. Duryea attended the dinner with the inventor. He told the club he owed a great deal to her loyal support and that of his mother, who is still living.

Entertainment at the banquet was provided by the Federal Motor Truck Co., of San Francisco.

The Northern California Section has announced that its meeting June 9 will be the annual get-together session of the year, and that the ladies are invited. The place will be the roof-garden of the Hotel Whitcomb, San Francisco.

Inter-American Agreement on Aviation is Reached

WASHINGTON, May 14—After three days' conference a compromise between the American and Colombian drafts governing air traffic over the Americas, was adopted this week by the Inter-American Commission on Commercial Aviation.

The draft provides that each country in Central and South America shall have sovereignty over the air of its country, but that there shall be free traffic over all countries by airplanes of non-military character, subject only to such barred zones as each country may designate. Planes engaged in international commerce must conform to regulations generally similar to those governing ships on the high seas.

Detroit Out to Get 1928 Aircraft Show

DETROIT, May 15—A move is on foot to make the All-American Aircraft Display, recently held in Washington, an annual affair, and Detroit aviation leaders are to make the motor city the scene of the exhibition in the future. Detroit has the necessary facilities for staging the show, and also has adequate hotel accommodations to take care of the guests, it is argued.

Germans Urge New Engine Volume Tax

Recommend Revision of Old Formula to Make Levies More Equitable

BERLIN, May 7 (by mail)—The German motor car taxes are to undergo a revision and for some time past the problems involved have been eagerly discussed by all interested in a just settlement. As in England, much has been made of a fuel tax, but it has been demonstrated that it would cost far too much to carry through.

Makers themselves say a consumption tax would probably be the nearest thing to a positively fair tax, but pointing to the aforementioned difficulties, they have resolved on a revised tax on engine volume.

Hitherto this has been levied on the basis of a wholly inadequate and arbitrary formula leading to the calculation of so-called "tax horsepower," which were taxed in accordance with a definite schedule by which the larger vehicles had to pay sums out of all proportion to the smaller, so that, for instance, a car twice as large as another had to pay about three times the amount of taxes.

The German makers propose a simple tax on the actual volume and suggest 25 marks per 250 cc. in the case of passenger cars and 16 marks per 250 cc. in case of motorcycles (a "mark" equals roughly one shilling or 25 cents). Utility vehicles, i. e., delivery cars, trucks, etc., shall pay 12½ marks per 100 kilograms. Two-stroke motors, which hitherto were treated by a separate formula, shall in future be dealt with same as four-stroke engines.

The makers, in recommending their scheme to the Government, have drawn up a conclusive calculation proving the income from this tax would be the same, viz., 100 million marks, as was collected last year.

164,500 Tons Reclaimed Rubber Used Last Year

NEW YORK, May 16—The amount of reclaimed rubber used in the United States during 1926 was 164,500 tons, equivalent to 46 per cent of the consumption of crude, F. R. Henderson, president of the Rubber Exchange of New York, said in a review just made public. The stocks in London on May 7 amounted to 68,187 tons, an increase of 1153 tons during the week.

Tag Branch in Cleveland

NEW YORK, May 16—C. J. Tagliabue Mfg. Co., Brooklyn, has opened a branch factory at 5902 Carnegie Ave., Cleveland, to provide quick service and cut general transportation charges for users of Tag instruments in Ohio, western Pennsylvania, Indiana and Michigan.

Brosseau to Speak at Bus Convention

PHILADELPHIA, May 16—A. J. Brosseau, president of Mack Trucks, Inc., and chairman of the highway committee of the National Automobile Chamber of Commerce, will speak on the "Field of the Motor Bus," at the first annual convention of the motor bus division of the American Automobile Association which will be held here June 15 and 16.

Other speakers who have accepted places on the program include H. G. Wells, member of the Public Utilities Commission of Massachusetts, who will speak on "Interstate Regulation of Motor Vehicles"; F. J. Scarr, consulting motor transportation engineer and formerly in charge of the Pennsylvania Railroad's auxiliary motor vehicle service, whose topic is "The Relation Between the Motor Bus and Steam Railroads"; Prof. Henry R. Trumbower, of the University of Wisconsin, formerly economist of the U. S. Bureau of Public Roads, who will speak on "The Economics of Highway Transportation," and C. T. McConnell, vice-president, Ohio Motor Bus Association, whose topic is "System a Prerequisite of Successful Bus Operation."

California S.A.E. Hears Steering Gear Discussion

SAN FRANCISCO, May 14—The Northern California Section of the Society of Automotive Engineers held its monthly banquet and meeting at the Engineers' Club this week. "Modern Steering Gears and Their Relation to Public Safety," were discussed in a paper by H. S. Watson, vice-president of A. H. Coates & Co., Pacific coast representative for Ross steering gears. "Permanent Paving and Its Relation to Economic Automotive Transportation," was the subject of Col. A. J. Eddy, city engineer of Berkeley, Cal. Enter-

Used Cars Will Be Main N.A.C.C. Topic

NEW YORK, May 17—The used car situation will be the principal subject of discussion at the members' meeting of the National Automobile Chamber of Commerce to be held June 2. Many factories in addition to sending their representative members to the meeting will also send their sales managers. Election of new directors will also be held.

Directors of the association will meet on June 2 for the election of officers and to take action on the year's budget. Recommendations for committee appointments will also be made.

At the truck members' meeting on May 31 the program will include discussion of the cooperative work among branch managers and dealers, such as now in effect in Chicago and New York; the 1928 Good Roads show at Cleveland, and of how changing methods of truck financing are affecting truck sales. The N.A.C.C. motion picture film, "Coordinated Transportation," will be shown.

U. S. Servicing Appliances Improve Motoring Abroad

WASHINGTON, May 19—Increased use of American automobile servicing appliances is bringing about a noticeable improvement in motoring conditions in Europe, it is announced by the Automotive Division, U. S. Department of Commerce. The United States export trade in automobile appliances has gained strikingly in recent years, the announcement states, but unfortunately these statistics have not been separated.

Coming Feature Issues of Chilton Class Journal Publications

June 4—Automotive Industries—Engineering Number.

June 10—Motor World Wholesale—A.E.A. Summer Meeting Number.

Oil Industry Unit Control Seen Likely

NEW YORK, May 16—The establishment of a dictator for the Seminole petroleum field is expected to lead ultimately to unit control in the oil industry unless the plan comes into conflict with the federal anti-trust laws.

The appointment of Ray H. Collins, of Tulsa, Okla., an independent oil operator, as arbiter with supreme authority, placed an artificial restriction on the output in the Seminole area, which became effective last week.

The program of curtailment which he will direct is to have a two weeks' trial. In the meantime a committee of five will seek to perfect a permanent plan to limit production of all producing areas in which there is a prospect of large new development.

The principal Standard Oil companies are recognized as the moving spirits in this effort to stabilize conditions in the industry. It is noted that this is the first time since the enactment of the anti-trust laws that a basic industry has attempted a movement of this kind to cure its difficulties.

Mid-West Finance Firms Consolidate

CHICAGO, May 18—Two of the large finance companies in the Middle West have consolidated under the name of the National Discount Corp. The combination was formed from the old National Discount Corp., and Motor Discount, Inc. Both companies served practically the same territories, and, as a result of the merger, important economies will result from the elimination of duplicated effort. The new finance merger starts off with a capital structure of \$2,000,000, \$8,000,000 in assets and a volume of about \$15,000,000.

E. J. Becker, former president of the old National Discount Corp., will preside over the destinies of the new company of the same name.

Builders Plan on Billion Dollars' Worth of Roads

WASHINGTON, May 17—Tentative plans for construction of \$1,000,000,000 worth of roads in the United States were considered by the American Road Builders Association at its annual convention and were referred to a congress of road officials, contractors and engineers which it will sponsor in Cleveland in January.

Charles M. Upham, managing director of the association, was appointed chairman of a committee to campaign against highway accidents through the medium of lectures, motion pictures, placards, radio speeches, the press and motor clubs.

Charles M. Babcock, chairman of the Minnesota State Roads Commission, was elected president.

Calendar of Coming Events

SHOWS

Budapest	June 4-15
Chicago	Nov. 7-12
Exposition, Coliseum, Automotive Equipment Association.	
Chicago	Jan. 28-Feb. 4
National, Coliseum, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.	
Cleveland	Sept. 19-23
Exposition, Public Auditorium, National Machine Tool Builders' Assn.	
Cleveland	Oct. 3-7
Exhibition, Public Auditorium, American Electric Railway Ass'n.	
Cleveland	Nov. 14-19
Convention Hall, National Standard Parts Association.	
Cleveland	Jan. 9-14
American Road Builders Association.	
Cologne	May 20-31
International Commercial Transport Exhibition.	
London	Oct. 14-22
Olympia Passenger Car Show.	
London	Nov. 17-26
Olympia Truck Show.	
Melbourne	May
International Motor Show.	
New Haven, Conn.	Sept. 6-9
Machine Tool Exhibition.	
New York	Jan. 7-14
National, Grand Central Palace, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.	
Paris	Oct. 6-16
Grand Palais.	

Prague	June 4-16
International Aeronautical Exhibition.	

CONVENTIONS

American Automobile Association, Bus Division Meeting, Ritz-Carlton, Philadelphia	June 15-16
American Automobile Association, Annual Meeting, Ritz-Carlton Hotel, Philadelphia	June 16-17
American Electric Railway Association, Public Auditorium, Cleveland. Oct. 3-7	
American Society for Steel Treating, Convention Hall, Detroit. Sept. 19-24	
American Society of Mechanical Engineers, White Sulphur Springs, W. Va.	May 23-26
Associated Automotive Engine Re-builders, Hotel Winton, Cleveland	May 26-28
Automotive Equipment Association Summer Convention, Multnomah Hotel, Portland, Ore. June 27-July 2	
Automotive Equipment Association, Coliseum, Chicago	Nov. 7-12
International Chamber of Commerce, Stockholm	June 27-July 2
National Association of Automobile Show and Association Managers, Drake Hotel, Chicago. July 28-29	
National Association of Credit Men, Brown Hotel, Louisville, Ky. June 6-10	
National Automobile Dealers Association, Los Angeles	June 14
National Automobile Dealers Association, San Francisco. June 21	
National Foreign Trade Council, Hotel Statler, Detroit	May 25-27
National Safety Council, Stevens Hotel Chicago	Sept. 26-30

National Standard Parts Association, Hotel Hollenden, Cleveland. Nov. 14-19
Society of Industrial Engineers, Hotel Stevens, Chicago
United States Good Roads Association, Savannah, Ga. June 6-11

N. A. C. C.

Cleveland, June 14-15—Factory Service Managers Forum, Hotel Statler.
New York, May 31—Truck Members Meeting.
New York, June 2—Annual Meeting.

S. A. E. National

Chicago, November—National Transportation and Service Meeting.
Chicago, Dec. 1—Tractor Meeting.
Cleveland and Detroit, Sept. 19-22—Production Meeting.
French Lick Springs, Ind., May 25-28—Summer Meeting.

RACES

Abilene, Texas	July 4
Altoona, Pa.	June 11
Altoona, Pa.	Sept. 5
Atlantic City	Sept. 24
Belgian Grand Prix, Spa-Francorchamps	July 9-10
British Grand Prix, Brooklands. Oct. 1	
Charlotte, N. C.	July 11
Detroit	Sept. 10
French Grand Prix, Montlhery. July 3	
Indianapolis	May 30
Los Angeles	Nov. 27
Salem, N. H.	June 25
Salem, N. H.	Oct. 12
Syracuse, N. Y.	Sept. 3